# Machine Shop

ECHNOLISK DEPARTMENT



STYLE A

for boring through holes from 3/32" dia, up



STYLE

JUN 1 3 1947

for boring blind holes, bottoming TR (at Internal threating from and facing from 1/8" dia up

### HERE'S WHY

### You should use

#### **BOKUM BORING TOOLS**

Helical relief maintains constant clearance angles.

Finish lapped cutting surfaces produce better bores.

Resharpening confined to one face.

Down time for regrinding reduced.

Unskilled help can use tools without loss of efficiency.

Send for catalog that shows all sizes and prices. Ask for No. 8-1139 for super high speed tools and for No. 8-398 for carbide tipped tools.



This BOKUM
TOOL HOLDER
provides

VERTICAL ADJUSTMENT for boring tools in lathes



BOKUM TOOL CO.

14775 WILDEMERE AVE. . DETROIT 21, MICH.

SINGLE POINT BORING TOOLS-INTERNAL THREADING, BOTTOMING AND FACING TOOLS-CARBIDE TIPPED TOOLS

Machining

une Sept. 1947

## with EULTON Tracer Control

#### For Precision Machining on Work of Various Sizes

Beautiful plastic chests such as the one shown here are made possible by the painstaking and highly skillful craftsmanship of the engraver who engraves a master model which is then transformed into a die or mold through the use of a Gorton Pantograph with Tracer Control which mills or engraves with true fidelity every mark of the original engraver's tool-

Tracer Controlled Milling is our term for Super-Speed precision milling, engraving, electrical etching or other metal removal operations using a Master pattern. There are many profitable applications for which this method is specifically indicated. It will pay you to investigate now.

#### Gorton Pre-Determines Results For You

Find out today if you can save money with Gorton Tracer Control. Send us a complete description with prints of one of your jobs. Our Engineering Department will prepare a production estimate on the same job tooled on Gorton Tracer Controlled equipment—no obligation.

#### PLEASE SEND WITHOUT OBLIGATION Bulletin No. 1653

Nanu

Address

Citiu Zane State

#### S ABOUT THIS JOB

OPERATIONS: Mill at 2 to 1 reduction increase design in center panel and

MACHINE: Gorton 3-L 3-dimension Pantograph.

13/4"
CUTTERS: Gorton single and multi-

SPINDLE SPEED: 7400 R.P.M.

TIME: Total time including setting-up, cutter grind ing and milling was 120 hours—a tremendous saving over any other method,

Bulletin 1655 will give you comprehensive information about Gorton Tracer Controlled equipment. Fill in and mail this coupon today!

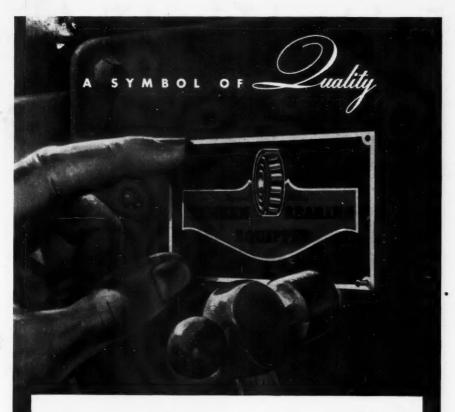


Tracer Controlled Milling

Use this

Handy Coupon

1706 RACINE STREET . RACINE, WISCONSIN, U.S.A.



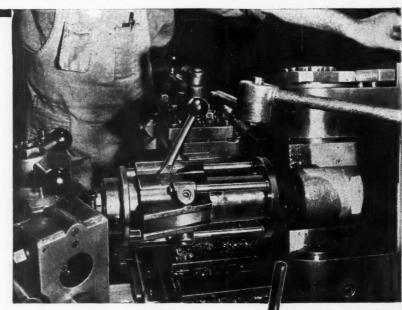
#### **Put It On Your Products NOW!**

When you identify your machines as "Timken Bearing Equipped" you greatly increase their value in the eyes of the prospective buyer; for the use of Timken Tapered Roller Bearings has been associated with top-notch equipment of all kinds for so long that "Timken Bearing Equipped" has become a Symbol of Quality wherever it appears. Thus Timken Bearings make better machines

and batter-selling machines. If you are using Timken Bearings, why "hide your light under a bushel"? Tell the world about it. It's a sales plus you can't afford to overlook. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN
TAPERED ROLLER BEARINGS

### For Internal Tapered Threads



The Landis Style LM Receding Chaser Collapsible Tap tapping 3" Stainless Steel Valve Body Castings.

LHIUIS THREADING EQUIPMENT

PRODUCES WELL-FORMED AND EXTREMELY ACCURATE THREADED PARTS

• The use of LM Receding Chaser Collapsible Taps enables an Eastern manufacturer of Stainless Steel Valves to thread parts in a highly efficient and satisfactory manner at minimum cost. The cutting action of the chasers used in the Taps is limited to the throat section by the receding mechanism of the tools. This makes possible the production of threads without chaser "leave-off" marks and assures smooth finished threads as well as long tool life.

Write for Bulletin G-81

LANDIS MACHINE COMPANY WAYNESBORD PENNA., U. S. A

THREADING MACHINERY-THREAD CUTTING DIE HEADS-COLLAPSIBLE TAPS

VISIT OUR EXHIBIT AT THE MACHINE TOOL SHOW

## WHERE PRECISION IS MAXIMUM YET PRODUCTION IS MODERATE





The customer's production requirements on this refrigerator piston and connecting rod job were moderate. He wanted low-cost manufacture with maximum precision.

Heald engineers tooled up the No. 48-A Precision Bore-Matic shown below with two separate holding fixtures. One is for finish-boring the wrist pin holes in the pistons. And the other holds the connecting rods, in which the wrist pin hole is finished to a .0002" size tolerance and the crank bore to a .0005" tolerance.

Chances are, too, that the right Heald Bore-Matic can solve your precision finishing problems—on jobs involving boring, turning, facing, grooving, chamfering, and even forming—singly or in multiple machining operations.

For that's our business—developing basic machining methods to a high degree of accuracy and finish, and at whatever rate of production you specify. Why not let us show you how our business can help yours? Write to: THE HEALD MACHINE COMPANY, Worcester 6, Mass.



INTERNAL AND SURFACE GRINDING MACHINES . BORE-MATIC PRECISION FINISHING MACHINES



The precision in Farrel internal gears is passed on from the machine on which these gears are made—the Farrel-Sykes Gear Generator.

The initial precision built into this Farrel machine plus the inherent accuracy of its operating principle—"precision generation"—gives the gears accurate tooth contour and tooth spacing. Because of this you can be sure that when you buy internal gears from Farrel, they will operate smoothly, quietly and efficiently over a long service life.

Precision generated internal gears with either spur or single helical teeth are available in any size up to approximately 16-feet diameter, 12-inch face, 1<sup>1</sup>/<sub>4</sub> DP.

Internal gears frequently meet design and operating conditions better than other types and their availability in large sizes has extended their advantages to many applications where size limitations formerly prevented their use.

Next time you need internal gears or gear engineering help call on Farrel.

FB-390

#### FARREL-BIRMINGHAM COMPANY, INC. 344 VULCAN STREET • BUFFALO 7, N. Y.

Plants: Ansonia, Derby and Stonington, Conn., Buffalo, N. Y.

Sales Offices: Ansonia, Buffalo, Stonington, New York, Pittsburgh, Akron, Chicago, Los Angeles, Tulsa, Houston, Charlotte



Farrel-Birmingham

**VOLUME 20** 

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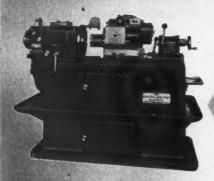


#### HOWARD CAMPBELL, Editor

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## A COMBINATION THAT'S HARD TO BEAT

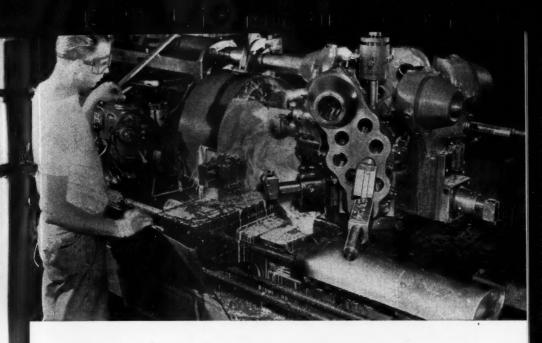
... Hanson-Whitney somi-automatic thread milling machines and ground multiple thread milling cutters





This combination assures you speed . . . accuracy no spoilage . . . economy and lower costs. Except for loading and unloading the H-W Thread Miller is entirely automatic and produces external or internal right or left hand, straight or tapered threads in one revolution of the work. The cutters are finished all over after hardening, the spacing, form and relief being held to very close limits. They can be relied upon for accuracy and durability. Inquiries pertaining to thread milling problems respectfully solicited.





## How this FASTERMATIC combined two jobs in one chucking!

Here, on a clutch sleeve, the Fastermatic eliminated an extra chucking and machining operation by the simple addition of a standard automatic recess boring attachment. The work, which previously required two machines and two operators, is now done complete in *one* Fastermatic operation. More concentric diameters are produced through a *single* chucking—and production is increased.

In case after case, the versatility of the Fastermatic together with the tooling "know-how" of Gisholt engineers have made it possible to handle more work

with standard tools and attachments, and do it on a cost-cutting basis.

Why not see for yourself what Gisholt's combination of EXPERIENCE and the RIGHT MACHINE can do for you?

GISHOLT MACHINE COMPANY
Madison 3, Wisconsin



THE GISHOLT ROUND TABLE represents the collective experience of leading specialists to help you solve your problems in the machining, surfacefinishing and balancing of round and semi-round parts. Ask Gisbolt for help on your problems.

## HERE'S A REAL CSt

#### ... grinding the teeth

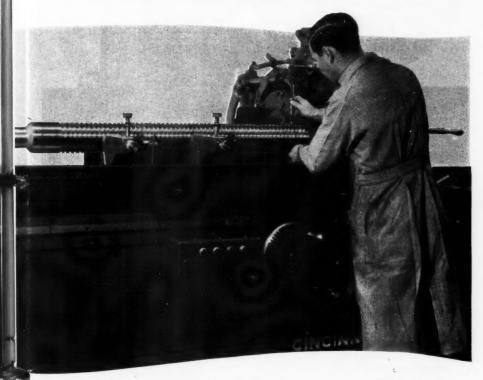
 Tailor-made parts manufactured in small auantities of say one to ten, and requiring several close tolerance grinding operations, afford an excellent test of the precision performance of the grinding machine. The internal broach being ground in the illustration on the opposite page easily qualifies as the daddy of all parts of this type as each tooth is ground separately. 

A prominent broach manufacturer chose a CINCINNATI FILMATIC Hydraulic Universal Grinding Machine for the job, because he can depend upon sizing. This is an exceptionally important consideration, for there can be no second guessing in grinding these expensive parts. Each tooth must be accurately around with respect to the next one. **QCINCINNATI FILMATIC Hydraulic Universal Grind**ers have many features of value in precision toolroom grinding, such as FILMATIC Grinding Wheel Spindle Bearings: Infinitely Variable Headstock Speeds; hinged Internal Grinding Attachment, and others. Would you like to know more about them? Catalogs listed below, sent on request.

CINCINNATI FILMATIC 14"
Hydraulic Universal Grinding
Machine. Catalog G-486-4
covers the 12" machine, and
catalog G-474-3 the 14", 16"
and 18" machines.

## of Performance

of an internal broach



Grinding an internal broach on a CINCINNATI FILMATIC 14" Hydraulic Universal Grinder. The taper portion is ground by the traverse method, and then each tooth is "backed off" separately, using the hand cross feed. The operator depends largely upon the cross feed dial reading.



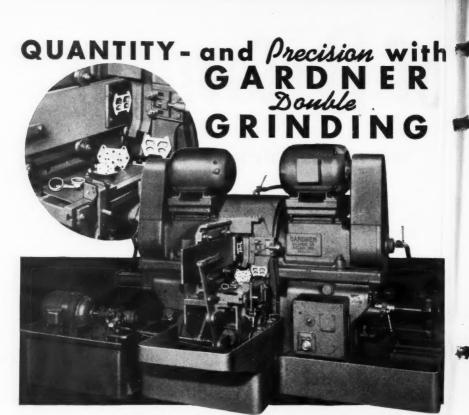
#### CINCINNATI GRINDERS INCORPORATED

CINCINNATI O. ONIO. N. S. A.

CENTER TYPE GRINDING MACHINES . CENTERLESS GRINDING MACHINES . CENTERLESS LAPPING MACHINES

June, 1947

MODERN MACHINE SHOP



ERE is another example of extremely close tolerances and peak production grinding TWO faces at ONE setting of steel valve plates and connecting rods; and "back-to-back" grinding of compressor heads — all parts of a well-known refrigerator unit.

The machine is a GARDNER No. 120A-23" GRINDER carrying an hydraulically-operated roller gun-type fixture. All pieces are handled in 2 cuts — roughing and finishing.

TOLERANCES: for the finish cut average

.0005" to .001" for flatness, and .002" for uniformity.

PRODUCTION: 4 to 6 pieces per minute, on connecting rods and valve plates.

8 to 10 pieces per minute on compressor heads. These parts, being ground on one face only, are held in a "back-to-back" fixture, which permits grinding 2 parts at one setting.

Check the possibilities for closer tolerances and higher production on YOUR flat surface jobs—

GARDNER-GRIND YOUR Flat SURFACES Write for 8-Page GARDNER-GRINDING Bulletin!

GARDNER MACHINE COMPANY
428 East Gardner Street \*\*\* \*\* Beloit, Wisconsin, U.S.A.



## ...when checked on The RED LINER

Not only the magnitude, but the nature and location of gear errors are recorded on a permanent-record chart. Each error produces a characteristic deviation from the datum line... whether it be eccentricity, variations in circular pitch, pressure angle, fillet interference or lack of continuous action.

The Red Liner assures precision production in your own shop... positive proof of high-quality gears for your customer. Write for the latest bulletin.

Fellows

THE FELLOWS GEAR SHAPER CO., HEAD OFFICE AND EXPORT DEPT., SPRINGFIELD, VERMONT. BRANCH OFFICES: 616 FISHER BLDG., DETROIT 2...OR 640 W. TOWN OFFICE BLDG., CHICAGO 12

## IMMEDIATE



#### SPECIFICATIONS

Maximum length	
that can be ground131/2"	
Maximum width	
that can be ground6"	
Maximum space under	
7" wheel to table111/2"	
Maximum space under 7" wheel	
to Browne & Sharpe No. 510	
Magnetic Chuck†8"	
Maximum diameter cup wheel	
with standard guard in place. 31/2"	

tNo. 510 Browne & Sharpe Magnetic Chuck not included as original equipment.

YOUR DELTA DISTRIBUTOR IS NOW SHOWING DELTA CUT-OFF MACHINE . . . DELTA MULTIPLE-SPINDLE DRILL PRESSES . . . DELTA ABRASIVE FINISHING MACHINES

## DELIVERY FROM YOUR DELTA DISTRIBUTOR'S STOCK

### Now you can get your Delta Toolmaker\* Surface Grinder!

You add to the life of your tools, at lower cost — with this husky, big-capacity Delta Toolmaker Surface Grinder. You make a big saving on initial cost, and enjoy ease and speed of operation on surface grinding, tool sharpening, etc.

The Delta Toolmaker Surface Grinder is on your distributor's sales-floor now. Inspect it there, to learn of the many famous Delta Toolmaker operating advantages. They include: Convenient controls. Wide micrometer graduations, for close settings. Unique wheel adapter that saves time and redressing.

Have your distributor also show you how — with simple attachments — this versatile machine becomes an efficient tool and cutter grinder or a chip-breaker grinder.

Your nearby Delta distributor is listed under "Tools" in the classified section of your telephone directory. See him soon.

Catalog No. 24-105 Toolmaker Surface Grinder (for 1425 and 1725 RPM motors) with cast iron legs, wheel adapter, holder for wheel dresser, one V-belt and two-step motor pulley (for 50 or 60-cycle service) with ½" bore. Without wheel, motor, or switch. Shipping weight 670 lbs.

#### DELTA MANUFACTURING DIVISION

ROCKWELL MANUFACTURING COMPANY
MILWAUKEE 1, WISCONSIN

General Sales Office • 6 NORTH MICHIGAN AVENUE, CHICAGO 2, ILLINOIS

\*Trade Mark Reg. U. S. Pat. Off.

M-23A

DELTA SUPER-HI\*-SPEED DRILL PRESSES . . . DELTA 17" DRILL PRESSES . . . . . . DELTA METAL-CUTTING BAND SAW . . . DELTA TOOLMAKER\* GRINDERS.

### FOSDICK HIGH SPEED DRILLS



Fairchild Cameras are precision instruments requiring exceptionally accurate machine work. Fosdick 6- and 4-spindle High Speed Drills are used extensively for drilling—reaming and counterboring various parts of these instruments.

The battery of 4-spindle High Speed Drills shown are drilling shutter housings for large F-55 camera. These are but a few of the jobs handled by Fosdick High Speed Drills in this plant. Cases—cones—lens—shutter housings—film magazine parts—all are handled by these high speed drills for precision holes from

0.16 inch to 11/4 inch.

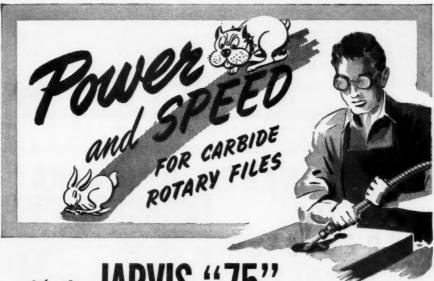
The tolerances maintained range from .002 inch for drilling—.0005 inch for reaming and .001 inch for counterboring.

This battery is only one of thousands of Fosdick High Speed Drills now operating in hundreds of plants producing precision work. Where they have been engaged in war production, they can and are being quickly converted to producing peace-time products.

For full particulars write for the Fosdick High Speed Drill Bulletin M.S.H.S.

**FOSDICK** 

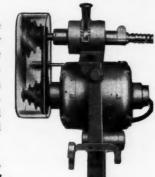
MACHINE TOOL CO. CINCINNATI 23, OHIO



with the JARVIS "75"

The Multi-Jarvis "75" flexible shaft machines provide the ultimate in extra power and constant high speed for use with tungsten carbide rotary files. Tough jobs are made easy...operator fatigue is held to the minimum. The Jarvis "75" is available in bench, roller-floor (with tool tray), overhead-suspended-trolley and overhead-suspended-saddle types. Bench and floor units swivel horizontally and vertically. All models are equipped with transparent plastic guards.

Jarvis tungsten carbide rotary files are ground-from-thesolid and are available in standard sizes in fine, standard or coarse fluting. Write for literature on Jarvis Power Tools.



Garvis POWER TOOLS

THE CHARLES L. JARVIS COMPANY
MIDDLETOWN IN CONNECTICUT

Tapping Attachments • Flexible Shafts and Machine • Quick Change Chucks and Collets • Rotary Files



#### HIGH SPEED DRILLING

FOR PRECISION RESULTS

"Buffalo" No. 14 High-Speed Sensitive Drills can give your shop extremely accurate drilling in capacities from the smallest commercial drills up to 3/8" . . . in the high speed ranges up to 9600 RPM. All parts are pre-



cision-machined to close tolerances, with rigid construction throughout. Space-saving multi-spindle lineups available in floor or bench models, with spindles as close as 9". Entire spindle safety-guarded except for chuck. Tapping attachments up to 1/2", if desired.

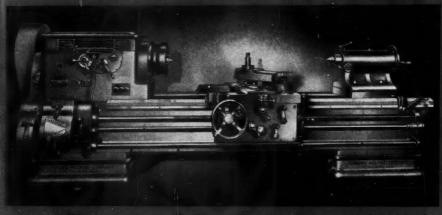
Write now for Bulletin 2726-C.

#### COMPANY FORGE BUFFALO

**388 BROADWAY** BUFFALO, N. Y. CANADIAN BLOWER & FORGE CO., LTD., KITCHENER, ONT.







#### # (FROM LETTERS IN OUR FILES • NAMES ON REQUEST)

1. "HYDRATROL Lathes have been very satisfactory over a very intensive 3-shift operation for a long time. They have saved us many man hours."

2. "For quite a few years we have had a large number of HYDRATROL Lathes in our shops here. The men working on these machines appreciate the ease of speed control afforded."

3. "HYDRATROL Lathes have been entirely satisfactory for turning high-strength forgings in record time."

Let us show you what a HYDRATROL Lathe could do in your shop. The 30" Standard Type, Heavy Duty lathe shown above, has all the ruggedness and power for the heaviest possible work. Send us prints for a specific recommendation.



#### LARGE HOLLOW SPINDLE TYPE 5 SIZES-18" to 36"

Small . . . . 18" up to 7 % " Hole Medium . . 24" up to 12 % " Hole Large . . . . 27" up to 13 % " Hole Large . . . . 30" up to 14 % " Hole Large . . . . 36" up to 16 ½ " Hole

(Standard type lathes, 16" to 36")

Dehmann MACHINE COMPANY

HOUTEAU AT GRAND • • • ST. LOUIS 3, MISSOURI

The most outstanding development in 20 years for machining non-ferrous metals...

## The New Warner & Swasey

#### **ACTUAL SHOP EXPERIENCE SHOWS THESE AMAZING RESULTS**

THE R. PERLICK BRASS CO., Milwaukee, invested in a new Warner & Swasey Electro-Cycle a few months ago for machining their brass specialties, brewers' fittings and beer dispensing equipment. On the basis of this one machine's outstanding performance, they have since purchased 2 additional Electro-Cycles.

#### 3 New Electro-Cycles Replace 6 Old Turret Lathes

When work that was formerly produced on Cone Head Ram Type Turret Lathes was transferred to new Warner & Swasey Electro-Cycles, greatly increased production showed that the Electro-Cycles would pay for themselves within 18 months.

#### 74.9% Production Increase

Twenty-two jobs turned out by the Electro-Cycle showed an average increased output of nearly 75%. This average covers the machining of at least 22,000 parts in large and small lots—from runs of 10,000 down to 100 pieces.

#### Tool Breakage Cut 15%

No new tools or chuck jaws were needed in effecting these production increases. Tools were simply transferred from old turret lathes to the new Electro-Cycles without need for adjustments. Sharp reductions in tool breakage, together with easier maintenance now result in a minimum of down-time in this shop.



#### Operators Report 50% Less Fatigue

The Electro-Cycle's completely AUTOMATIC SPINDLE CONTROL means less effort for the operator. These employees of the R. Perlick Brass Company say work fag has been cut at least 50% by their Electro-Cycles. Controls are so simple, even inexperienced men soon become capable and efficient operators.



Electro-Cycle Turret Lathe



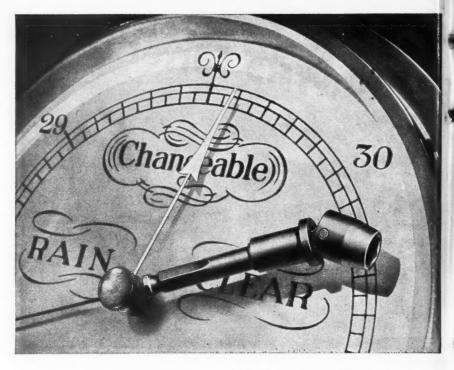
#### Here's Why the New Electro-Cycle Means Bigger Profits in Non-Ferrous Metal Turning

COMPLETELY AUTOMATIC SPINDLE CONTROL, exclusive with the new Warner & Swasey Electro-Cycle results in less machine tool handling time —increases production with a minimum of scrap loss and tool breakage.

Push buttons preselect spindle start and stop, spindle reverse, and speed changes for any turret position. Manual operation of the headstock is eliminated. A wide variety of jobs formerly difficult and costly, can now be machined quickly and easily.

WARNER
&
SWASEY
Machine Tools
Cleveland

You Can Machine it Better. Faster, for Less... with a Warner & Swasey



#### Long range forecast: Lower tool cost

Apex sockets and wrenches save you good money by staying on the toughest jobs as much as three times longer than ordinary sockets, Because:

1. They're cold broached (from high carbon alloy bars) and carefully heat treated to the right temper: the right combination of wear resistance and shock resistance.

2. You can specify the hardness you want for your particular job—and get it in any item in the Apex line.

3. You can select from literally thousands of standard items—plain and universal sockets,

plain and universal wrenches, Allen drivers, straight wrenches —for the full range of hex and square nuts and for all standard drives. PR

All Puri Univ

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4. We quote promptly on "specials"—just send us a sketch, print, or description. Write for 105-page Catalog No. 18.

The Apex Machine & Tool Co., 1028 S. Patterson Blvd., Dayton 2, Ohlo

## APEX SOCKETS

Safety Friction Tapping Chucks; Quick Change and Positive Drive Drill Chucks; Vertical Float Tapping Chucks; Parallel Floating Tool Holders; Power Bits for Phillips, Slotted Head, Frearson and Clutch Head Screws; Hand Drivers for Phillips and Clutch Head Screws; Aircraft, Industrial Universal Joints, Sockets and Universal Joint Socket Wrenches.

Time-Tested Gervice-Troved

#### YEARS

ENGINEERING "KNOW HOW" GUARANTEE THE PERFORMANCE OF

multi-Purpose SHAPERS

They're FIRST for PRECISION ... They're FIRST for CUTTING PRODUCTION COSTS...

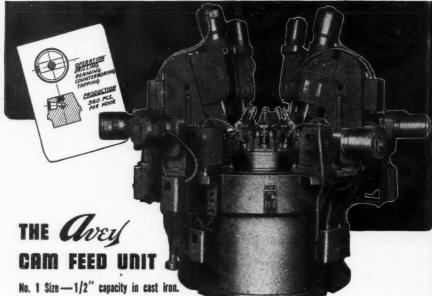
All three models of GEMCO Multi-Purpose Shapers...Plain, Production, and Universal types...incorporate important features in design that have been proved by 30 years of research, proved by actual tests in countless machine shops or suggested by operators from all parts of the country. These superiorities, resulting from the composite thinking of men who know, make GEMCO Shapers first for high performance, wide adaptability, maximum economy and lower production costs...and increased profits, featuring in addition, GEMCO'S own exclusive LUBRIGARD, the safety device that prevents damage to the machine through any failure in the lubricating system, GEMCO Shapers give longer, trouble-free service. Complete and detailed description of the features found only in GEMCO Shapers are set forth in the Bulletins that are free to you for the asking.

WITH EXCLUSIVE

GINEERING

Avey Automatic

**METHOD No. 6** 



Designed for multiple operations on angular holes — drilling, reaming, counter-boring and tapping at one clamping of work.

Mo. 2 Size — 7/8" capacity in cast iron.

Send For Engineering Bulletin 645

THE AVEY DRILLING MACHINE CO. CINCINNATI . OHIO . U. S. A.

Accelerated production obtainable by free loading time, and multiple operations obtained in time of longest single operation — machine automatic index as a pace-setter.

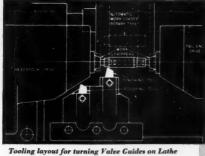
METHOD No. 6 — higher production, lower cost per piece, greater accuracy—(no re-loading)—fatigue at a minimum by semi-skilled operators with minimum supervision.



### MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE So-owing PEOPLE" SENECA FALLS, NEW YORK

COST ON VALVE GUIDE JOB REDUCED 73.6%



Tooling layout for turning Valve Guides on Lathe illustrated at right.

**Problem:** To reduce cost of rough and finish turning valve guides.

Solution: The Lo-swing IMP Automatic Lathe was selected for this job and fitted with a new type Rotary loader and a complete new adaptation of tooling. This lathe is equipped with special revolving head and tailstock spindles and the advantage of this double-end drive is two-fold: 1—Since the piece is driven from both ends much coarser carriage feeds are possible, thereby considerably increasing production; and 2—inasmuch as both spindles are driven, there is no wear on the revolving centers.

The machine is entirely automatic. Valve guides which have been previously bored to size are placed in a loading chute and fed by gravity into openings in the Rotary loader. The loader indexes the pieces to the proper position where they are automatically picked up by the continuously revolving spindles of both heads.

The OD is rough and finish turned in the same operation with two separate carbide tools, each having its individual feed. The finish turning tool begins cutting after the roughing tool has been relieved from the work, thereby assuring close concentricity between the bore and the finished diameter.

On high production jobs operator fatigue is an important item . . . automatic work handling permits full mechanical efficiency of equipment and reduces accident hazard.

The Rotary type loader assures complete control over the fast revolving pieces eliminating danger to the operator and damage to the pieces which are completely stationary by the time they reach the discharge chute.

One operator attends two of these IMP Lathes and produces 73.6% more work per hour than was produced on the former single machine with hand loading. If your per piece costs are too high, maybe Seneca Falls can help you.

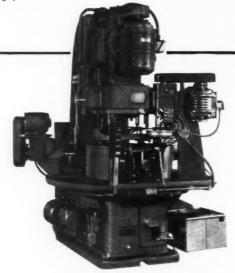
SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

#### MORRIS

MOR-SPEED

#### MEETS JOB REQUIREMENTS FOR HIGH PRODUCTION

This machine was designed and built by Morris to meet specific job requirements. It is a Hydraulic Vertical Six Station Automatic Indexing machine arranged for drilling, reaming, countersinking, counterboring, and tapping operations. There are 16 vertical spindles—2 horizontal spindles—and 1 tap head with 3 spindles. The operations listed are performed on auto transmission parts. When your work calls for similar operations and high production at low costs consult Morris. They have the engineering "know how," experience and facilities to help you.







## BALL BEARING SPINDLE MOUNTING

PERMITS HIGHER CUTTING SPEEDS . . .
REQUIRES NO BEARING ADJUSTMENT . . .
SUSTAINS ACCURACY OF LOGAN LATHES



**Quick Change Gear Cabinet Turret Lathe** 

SPECIFICATIONS COMMON TO ALL LOGAN LATHES . . . swing over bed, 10½". . . bed length, 43½" . . size of hole through spindle, 25/32" . . . spindle nose diameter and threads per inch, 1½"—8 . . . 12 spindle speeds, 30 to 1450 rpm . . . motor, ½ hp, 1750 rpm . . ball bearing spindle mounting . . . drum type reversing motor switch and cord . . . precision ground ways, 2 V-ways, and 2 flat ways.

With its spindle turning on a pre-loaded ball bearing mounting of extreme precision, the Logan Lathe is inherently well adapted to accurate work at higher spindle speeds. This fact permits the use of high speed carbide cutting tools to full advantage. It assures a minimum of spindle deflection. And since no bearing adjustment is required within the full range of its speeds, 30 to 1450 rpm, the accurate factory alignment of the Logan Spindle remains undisturbed, and original accuracy is sustained. Grease sealed, the Logan Spindle Mounting never needs lubrication. All these characteristics are important factors in the proved ability of Logan Lathes to speed output and cut costs on production lines, and to do fast, accurate work in the tool room. See your Logan Lathe dealer, or write direct for the Logan Lathe catalog.

LOGAN ENGINEERING CO. CHICAGO 30, ILLINOIS

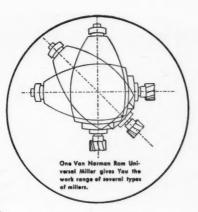
### Van Norman Ram Type Millers

Provide \*



Table: 45" x 10" Range: 28" longitudinal, 10" cross, 17" vertical 18 Speeds; 18 Feeds

It Pays to



- \* Horizontal, Angular, Vertical Milling . . . All with ONE Miller
- \* Ease of Operation with Front and Rear Directional Controls
- \* Greater Work Range with Movable Ram

Only Van Norman Ram Type Millers give you the adjustable cutterhead...an exclusive feature on Van Norman Ram Type Millers that permits you to perform every type of milling from horizontal to vertical...provide the work range of several single-purpose machines with one miller.

This advantage is especially important to those plants where daily milling requirements continually change. For example, one job calls for horizontal milling, the next vertical, etc.... with Van Norman millers the operators simply swivel the adjustable cutterhead to the required position and go ahead with the work. This advantage multiplies when a number of ram type millers are available.

In addition, the versatility of these millers

enables operators to increase production by as much as 50% because idle machine and operator time is minimized. Work resetups on most jobs are practically eliminated. Other Van Norman features that speed production, cut costs, include—finger-tip directional front and rear controls of all power feeds, movable ram, exclusive Van Norman rotary feed selector and large easy-to-read dials, plain or swiveling tables.

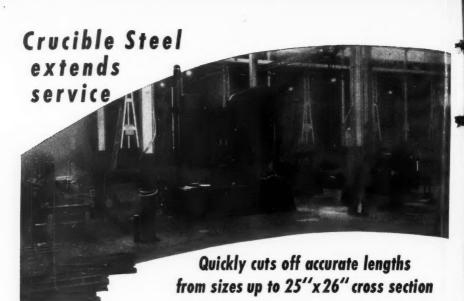
Minimize costly delays and get maximum milling production... use Van Norman Ram Type Millers. Write for complete information, today.



VAN NORMAN COMPANY

SPRINGFIELD 7, MASSACHUSETTS

Van Hormanize



No. 24 MARVEL giant Hydraulic Hack Saw, (capacity 24" x 24"). Employs new Stroke" sawing action and trouble-free low pressure hydraulic control.

No. 9A MARVEL Production Saw (capacity 10" x 10"). Automatically feeds, measures and cuts-off identical lengths from single or nested bars with no more operator attention than an automatic screw machine.

No. 6 MARVEL Saw (capacity 6" x 6"). A high-speed, heavyduty, all-ball-bearing sawoperates up to 149 strokes per minute, cuts thru 64% of each stroke, returns in 36%.

The Crucible Steel Company of America with 26 branch warehouses and sales offices, has built a reputation for anticipating customers' needs, not only in high grade and special steels, but in service requirements as well. They were among the first to equip several of their warehouses with modern high speed MARVEL Saws (No. 6 and 9A series) in order to give fast service on either single lengths or large quantities of identical pieces, accurately cut from bars up to 10" x 10" cross section. Now in anticipation of new demands for larger sizes, they are the first steel company to install a No. 24 MARVEL Hydraulic Hack Saw in order to give fast service on orders for steels of any type in sizes up to 25" x 26" cross section.

This giant hack saw, which almost qualified as a "secret weapon" because it contributed so materially to our production capacity in building naval ordnance, applies an entirely new principle of reciprocation that has made "hacksawing" of large work practical for the first time.

Whatever your metal sawing problems, there is a MARVEL Saw exactly suited to your needs. A MARVEL field engineer will be glad to go over your metal sawing problems with you.

#### RMSTRONG-BLUM

"The Hack Saw People"

5700 BLOOMINGDALE AVENUE, CHICAGO 39, U.S.A.









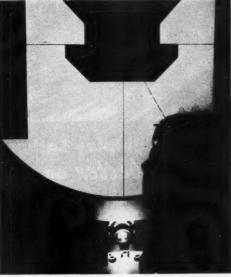








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PHOTOGRAPH Courtesy The Elliott Company, Jeannette, Pa.

THE dovetail shanks of steam turbine blades and many other turbine components are inspected easily and quickly on Jones & Lamson Optical Comparators. By any other means inspection would be a slow and costly process.

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MACHINE COMPANY Springfield, Vermont, U.S.A.



Manufacturer of: Universal Turret Lethes + Fay Automatic Lethes + Automatic Double-End Milling and Contering Machiness Automatic Thread Grinders - Optical Comparators - Automatic Opening Threading Dies and Chasers - Gound Thread File Ralling Dies.



• Just as operators and supervisors approve operating advantages of new Lodge & Shipley Lathes, so top management appreciates their remarkable profit records. Lodge and Shipley Lathes look *even better* on the Profit Sheet!

In the front office . . . where production and cost figures get the final going-over . . . you'll find Lodge & Shipley boosters, too!

The records shown in the illustration are authentic, taken from reports of Lodge & Shipley Lathe Owners\*... indicating the exceptional results obtained in plants of every type and size.

Lodge & Shipley Engineers will be glad to help you check your present lathe production costs against actual comparable costs for the new Lodge & Shipley Lathes . . . show you how to check sharply mounting cost trends. Write for Condensed Catalog showing the complete Lodge & Shipley line.

\* Names and additional data on request.



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## Lodge & Shipley

MACHINE TOOL DIVISION • 3055 COLERAIN SPECIAL PRODUCTS DIVISION • 800 EVANS ST.

# Different Types And They're All ... Hy-Draulic

Whatever you may require of your shaper or planer equipment, there's a Rockford Hy-Draulic machine tool to meet your needs. Because Rockford machines are Hy-Draulic they offer many important advantages in easier operation, speed, quality of work, and low overall costs. Rockford Hy-Draulic planers and shapers are built in a wide range of sizes and in five basic types.

RAM-TYPE SHAPERS... available in rated stroke sizes of 12", 16", 20", 24", and 28". A special 24" machine is also built with non-standard table specifications for specialized work.

2 OPENSIDE SHAPER... built in 36" table stroke size. Provides shaper speeds and rigid mounting for tool.

3 SLOTTERS... Ram assembly may be set in a tilted plane up to 10° off-vertical. Table provides longitudinal, transverse and rotary feed. Built in 36" and 48" stroke sizes.

4 SHAPER-PLANERS... of practical use in a wide range of applications where smaller-type planer work must be done. Built in stroke sizes of 42", 66", 90", 120", and 144".

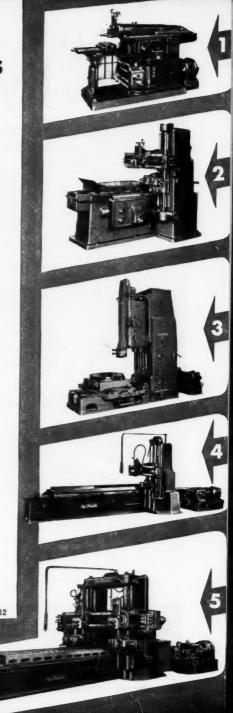
**5** PLANERS... Double-Housing and Openside ... each type built in four rated sizes from 36"x 36" to 60"x60"; maximum stroke lengths of 10, 12, 14, 16, 18, or 20 feet available in each size.

Information on all Rockford Hy-Draulic machine tools will be sent promptly upon request. Write for Catalog 1946... your inquiry is invited.

ROCKFORD MACHINE TOOL CO.
Rockford Illinois

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## A New Hypro Planer

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Write for Catalog 247

Sizes: 24"-30"-36"
Double Housing or Openside

THE CINCINNATI HYPRO PLANER COMPANY

PLANERS - BORING MILLS - PLANER TYPE MILLERS
CINCINNATI, OHIO

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the Thor

"Shock-Absorber" Spindle

PROTECTS THE MOTOR AGAINST VIBRATION

Resilient, metal strips absorb the shock.

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TOOLS

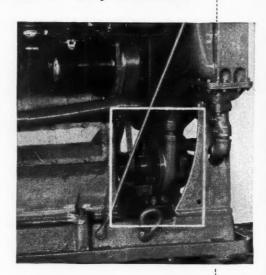
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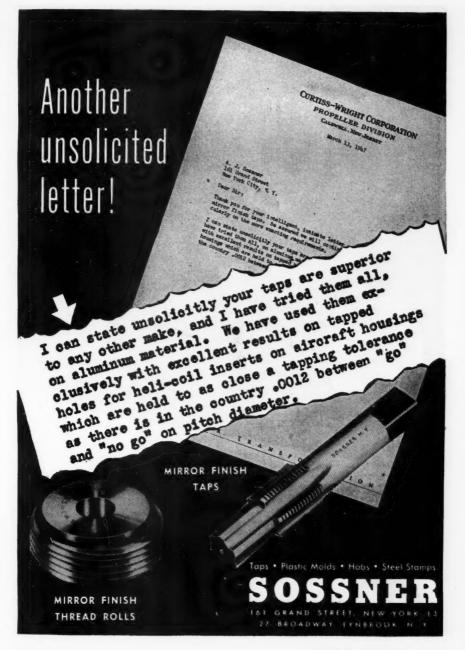
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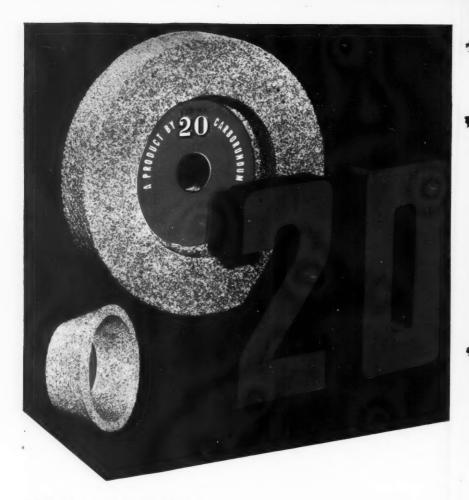
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Write for FULFLO MECHANICAL DATA BOOK, on your letterhead, please.

Specialties Co., Inc.





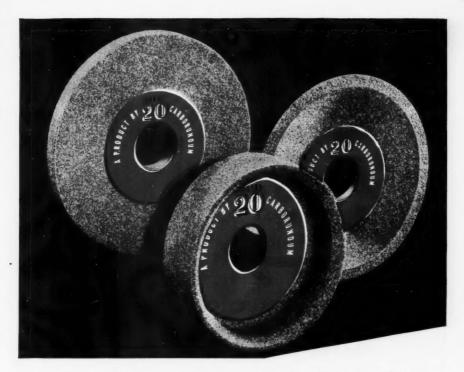
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#### "SERIES 20" GRINDING WHEELS

An Important Development by the leading name in Abrasives



"Carborundum" is a registered trademark which indicates manufacture
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Setting higher standards of grinding while effecting production savings, "Series 20" is now ready. Seven important advantages stand out.

- 1 Faster Stock Removal
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- 5 Longer Tool Life...between grinds
- 6 Increased Skill for Operators
- 7 Lower Wheel Inventory

A development of our technical laboratories, "Series 20" exceeds all expectations. Tests have been conducted under a variety of conditions in a diverse list of factories. Especially for tool room use, "Series 20" represents one of the most progressive accomplishments of modern abrasive engineering.

In specifying "Series 20", the range of work classifications includes surface grinding, wet or dry operations, tool and cutter grinding and surface form grinding. Standard sizes and shapes are available for specific requirements of modern machine applications and grinding techniques. Because "Series 20" covers a broad range of grinding, actual needed inventory can be smaller.

To be sure of the best grading for your specific grinding jobs, we suggest talking it over with one of our representatives. In the meantime, send for booklet "Check List for Better Grinding." The Carborundum Company, Niagara Falls, New York.

A Good Rule for Good Grinding . . . CALL IN

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### BUHR

ADJUSTABLE
DRILL HEADS
FOR
QUICK LOW COST
SET UPS



Buhr adjustable heads have been used economically for intermittent set ups on short orders and small production jobs. They are made in sizes and number of spindles to fit any ordinary layout of holes. Buhr has been the pioneer in ball bearing, induction hardened shaved gear drill head construction. Adapters are separate and are interchangeable from one press to another. They are so constructed the operator can quickly set the head in any desired radial position to suit drill jig and drill press quill.

The 02-S head shown has two spindles which have a maximum capacity in cast iron of ½" drill. The distance between spindles is 51/64" minimum; 2½" maximum.

Heads are self-contained and parts run in light grease. Spindles can be furnished with Buhr collets or Jacobs Chucks.

HIGH PRODUCTION MULTIPLE SPINDLE MACHINES FOR

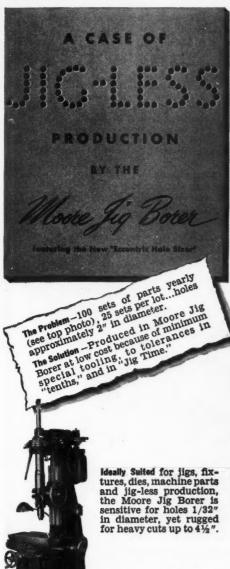
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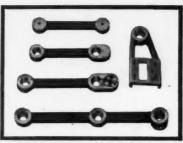
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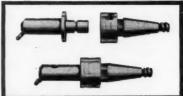
BUHR Machine Tool Co.

845 GREEN ST.
ANN ARBOR, MICH.





The Parts—Aluminum castings, requiring stock removal, hole location and hole sizing.



New Moore Eccentric Noie Sizer (shown assembled and disassembled)—sets a carbide bit to .00005" (half-tenth) simply and easily. Taper shank allows tool changes in matter of seconds and will repeat hole diameters when single point sizing. Vernier setting of bar permits fine adjustment through a range of .004", plus conventional tool bit adjustment.



In The Moore Jig Borer—Simple fixture holds work. Speed in handling this production problem is due to Moore Jig Borer's wide spindle speed range (to 2,600 RPM), and quick-setting lead screws. The latter are ground to an accuracy of .0002" in 16".

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MOORE JIG BORER



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#### STEP-SHAFTS AIR-TRACED

for greater economy

Turning step-shafts? Here's how to save—on setup time, on resharpening time, on machining costs—and on original machine investment.

The gear blank shown is a typical example. Turned on a multiple-tool automatic, the setup requires anywhere from 2 to 3½ hours. When AIR-TRACED, although machining time is the same, setup is only ten minutes or less. There's only one lathe tool to sharpen—and the machine is easily adaptable to a wide range of work—boring or turning—contours, tapers, step-shafts. Accuracy is greater, too, because operation is stepless, continuous—and automatic. There's less chance for human errors. Result? Fewer rejects, lower machining costs.

May we show you how the Monarch Air-Tracer can give you accurate, economical high production on your class of work? Ask for bulletin 2601.



Lathes.



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THIS manufacturer of bottle washing machines was using flexible shaft type grinders with 14" cones to clean flash off bottle grippers. Speed was 3600 R.P.M. Output per man per day was 150. The Rotor Application Engineer saw the job and recommended M-1086 Rotor Cone Wheel Grinders. Their speed is 17,000 R.P.M. They were installed with these results:

Labor cost cut 75%. Output was increased from

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Wheel cost cut 80%. Cone wheels with old grinders were good for 30 pieces. With high speed Rotor tools, they're good for 150.

The Rotor Application Engineer may find similar savings in your production.

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THE ROTOR TOOL

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HIGH CYCLE

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In the unique action of Brightboy's abrasive-plus-rubber content, the abrasive burrs and finishes while the rubber cleans and polishes. Brightboy takes up where grinding abrasives leave off—bridges the gap between the grind and buff.

Your abrasives stock isn't complete unless you have Brightboy wheels, sticks and hand tablets on your shelves—ready for the hundreds of uses to which this versatile abrasive can be put in the finishing of products in metals, plastics and wood. Ask your dealer for the Brightboy Catalog Manual and prices. Write us to have a Brightboy service man suggest methods and production short-cuts.

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e Easily, quickly fitted to Lathes, Shapers, Milling Machines, Turret Joring Mills, Hobbing Machines, Hand and Automotic Screw Machines and dozens of other applications.



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Insure yourself of economical, efficient production. Install the famous Turner UNI-DRIVE! Get more work from your older machine tools. 3, 4, 6, and 9 speeds! Operates each machine independently . . . no belts to shift. Increases versatility . . . boosts output . . saves time . . . reduces power costs. Thousands are in use. Write today for complete information. Cut costs, increase production in your plant with the Turner UNI-DRIVE!

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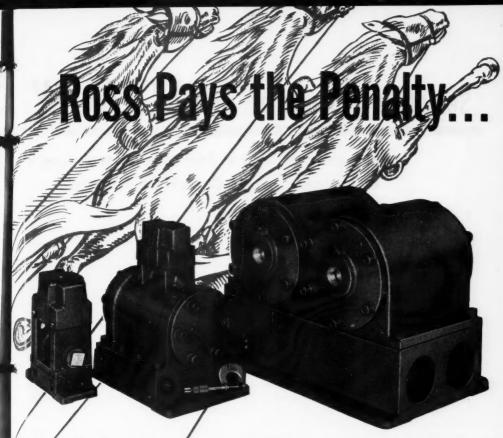
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As the power of modern machinery grows, Ross is obligated to develop fast, safe, sure controls to bridle these servants of industry. Each problem results in a further expansion of the Ross line. Thus Ross wins and holds the confidence of designers and engineers in the field of machine control, for they have learned to rely on Ross.

The scope of the Ross line is symbolized by the valves shown . . .

#700—¼"to ¾"pipe size, available as 3-way, 4-way, or 4-way, 5-port. Solenoid operated, general purpose.

#707—2" capacity, 3-way, solenoid operated. Introduced recently—units were incorporated in design of continuous steel tube piercing mill, unique in its fleld. All operations automatic.

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There are more than 500 valves in the Ross line, working for the benefit of all industry.



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Complete information on analysis, applications, critical temperature, forging, annealing, hardening, tempering, and hardness, together with TTT curves where pertinent. Send for data sheets on all types of steels you use.

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Buffalo	Cleveland 3521	Newark	Market 3-3415	Springfield	2-5158
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Each of Crucible's 26 branch offices and warehouses carries complete stocks of all sizes and grades of specialty steels norally used in its territory. Your orders get prompt attention. Deliveries are equally prompt. Consider your Crucible warehouse as your main stockroom for the full range of specialty steels, thus reducing your inventories and simplifying and centralizing your buying.

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Enco Lathe Turret

Mount Largest Tool Bits

Carbide tipped and high speed tool bits diffuse heat faster and last longer if maximum sizes are possible. Enco Lathe Turrets make this possible. Important economies are many—less time lost for tool changes, less tool breakage, fewer "grinds," longer tool life. Larger tool shank is more rigid under heavy cuts, giving faster operation and better finish on work.

Model R-4 mounts up to 3/4" x 1" tools, \$66.50. Other turrets mount up to 2" high tools. When ordering show tool size and dimensions.



Model R-41/2

When the carbide tip on a tool shank is twice the size of one normally used, tool heat is proportionately diffused—higher speeds, greater rigidity and accuracy result. Enco Turrets permit mounting larger tools.

Write for "30 Models Catalog." Address Department 16.

¢ OF SPINDLE								
Make of Lathe and A B C D E Maximum tool size desired								

"A" dimension range (From diagram here)	MODEL 6-5*	MODEL 41/2-5°	MODEL 31/2-S	MODEL 21/2-S	MODEL H
	· // 10 ± /4 mcr.	116 10 2 /2 11101.	1 /8 10 1 /4 11101.	/8 10 1 18 Inci.	78 10 · 18 · men
LATHE SWING	14" to 20" swing	13" to 16" swing	10" to 13" SWING AND BENCH LATHES	BENCH LATHES	BENCH LATHES
TOOL SIZE RANGE	<sup>5</sup> / <sub>8</sub> to 1 <sup>1</sup> / <sub>4</sub> " or No. 2 toolholder for <sup>3</sup> / <sub>8</sub> " square bit—	3/4" to 3/4" swing	14" to 1/2"	1/4" to 3/4" incl.	1/4" to 3/4" incl.
SPECIFICA- TIONS	4 tool, 12 posi- tions 6" square	4 tool, 12 posi- tions 41/2" square	4 tool, 12 posi- tions 31/2" square	4 tool, 12 positions 21/2" square	6 tool, 12 posi- tions 23/4" hex.
	PRICE \$99.00	PRICE \$49.50	PRICE \$35.00	PRICE \$23.00	PRICE \$25.00

\*Equipped with compensating spring—not required on smaller turrets.

#### ENCO MANUFACTURING COMPANY

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EXPORT DIVISION: Engineering Building, 205 W. Wacker Drive, Chicago.



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#### GENERAL PURPOSE CARBOLOY BLANKS



From 60% to 80% of your single point turning, lacing, boring jobs can be done with 5 styles of these standards.

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Standard reamer, scraper and lathe center blanks offer maximum economy for these special uses.

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Adaptable to solid boring tools, Adaptable to solid Doring (2018, tool bits and wear resistant uses, tool bits of these solid Carbolov cylinders in your tool crib will provide for many uses.

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Stocked in 15 diame-ters from 164" to 36" in random lengths from 4" to 12". Priced as low as 12c per inch. Excellent for wear re. sistant uses.

#### CARBOLOY TWIST DRILL TIPS



For economical drilling of cast iron mon-ferrous metals. Priced from 15c up. Wide range of sizes. Immediate deliveries.

#### SOLID FACE MILL BLADES



Blades ground on three sides ready for use, with clearance angles formed (not ground) on both ends, for either right or left hand cutters.

#### SOLID GROUND BALLS



For long economical life on sizing and burnishing operations. Also used in check valves. Sizes 1/6" to 1".

#### SOLID GUIDE RINGS

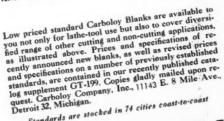


For use as a guide for textiles, wire, and similar wear-resistant applications. Now widely used on better fish rods.

#### BLANKS FOR THREADING TOOLS



Stocked for use in tool sizes  $\frac{1}{2}$   $\frac{1}{2}$   $\frac{1}{2}$   $\frac{1}{2}$   $\frac{1}{2}$   $\frac{1}{2}$   $\frac{1}{2}$   $\frac{1}{2}$   $\frac{1}{2}$   $\frac{1}{2}$  Priced 26c to \$1.00. Standard in Grade 78B.



Standards are stocked in 74 cities coast-to-coast



Carboloy Tool Catalog Send for Supplement GT-199

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Every working day thousands of plants all over the world prove the....



# Unqualified Excellence



#### of GRAND RAPIDS GRINDERS

here's why • Every Grand Rapids
Grinder, large or small, has every essential feature
for fast, efficient, low-cost production.
Refinements in construction details such as the
massive castings, heavy, rigid spindles,
separate spindle motors, assure years and
years of trouble-free life.
Grand Rapids No. 60 Universal Cutter and
Tool Grinder and No. 35 Grand Rapids
Hydraulic Feed Surface Grinder will handle
all of your tool room jobs from grinding of dies
to sharpening all types of milling cutters,
reamers and similar tools.

#### What "GRAND RAPIDS" quality means:

Gallmeyer & Livingston cast their own closegrained gray iron, machine to micrometric tolerances, and precision-assemble grinding machinery of unsurpassed performance. *Grand* Rapids means top quality in grinding machinery.

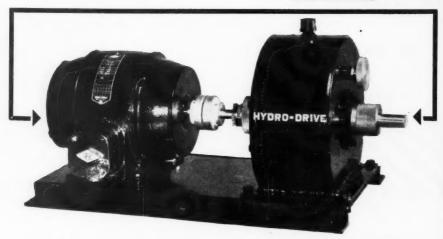
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GALLMEYER & LIVINGSTON COMPANY
308 STRAIGHT AVENUE, S. W., GRAND RAPIDS 4, MICHIGAN

INPUT 1750 rpm.

OUTPUT 1 rpm. to 1600 rpm. CONSTANT TORQUE



#### HYDRO-DRIVE HAS EVERYTHING

- INFINITE VARIABLE SPEED—1 to 1600 rpm.
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Precision and high-speed sawing of all materials, metals, weeds, plastics. Saw sizes and accessories to see all requirements.

CONTOUR SAWING

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CONTOUR SAWS: 13 models; all prices. Low and high speeds, step or variable. Precision or high-speed cutting.

BAND SAW BLADES: Razor-sharp, superhard teeth. No resharpening needed.

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Send for free pictorial booklet "DoALL EQUALS TEN PLUS" which compares fast, efficient Contour Machining with other metal cutting processes. Shows how this miracle method of low-cost production makes great economies. PRECISION SURFACE GRINDER



# NOW...2 Weeks' Delivery On Govro-Nelson Model "H" Drilling Units

Thanks to increased receipts of motors, we can now make deliveries of Model "H" Automatic Drilling Units in 2 weeks' time.

The Model "H" Unit, with 1725 RPM spindle speed, is suitable for drilling jobs with drills from .100" to 3/8", within the limitation of the spindle speed. Customers using the Model "H" Unit during the past 10 years know it is very fast and extremely rugged. The units can be set up in multiples at any angle or in any plane to drill several holes at the cost of one.

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Production A line of a lathe-mounted Dumore Surface on popper, valve production by Production by String at Zagar Tool in Cleveland.

Maintenance Northwest Airlines are on a Bropeller reduction grand accuracy for broach

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Any basic machine fool plus a Dumore is a

G-SA

#### for your production, toolroom, or maintenance shop

Avoid heavy investment in special machines by using versatile Dumore Grinders. They convert basic machine tools—equipment you already have—into dependable precision grinders for cylindrical, surface, tool, and thread grinding.

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In your toolroom and maintenance shop, a Dumore is indispensable because of its set-up speed and adaptability to a variety of different jobs in a single work-day, Its dependability, accuracy, and versatility can be equally valuable in your production departments.

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Sold by leading industrial distributors in all principal cities.



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Guarantees Maximum Production, Life, Efficiency from HIGH POST DRILLS (Some 3" Drills Cost \$82.50) Send Us a Few of Your Drills to Sharpen for

Excessive drill costs and imperfect holes, in most cases, can be traced to improper grinding of the drill points.

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MACHINE GRINDING has proven a more accurate

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THE OLIVER 510 DRILL POINTER will grind all drills from 1/4" to 3" with the proper point angle and clearance for your job. AUTOMATIC OPERATION, Heeman Element Eliminated-Bench model available for small drills.

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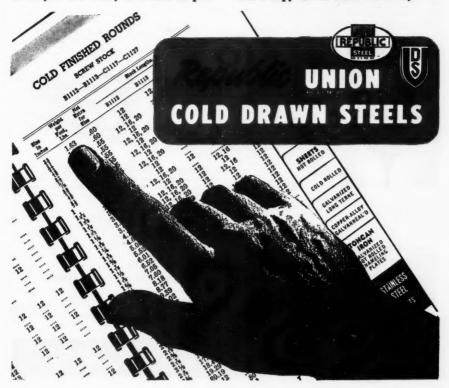
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He carries diversified stocks of cold drawn steels for YOUR convenience saves you the worry and cost of purchasing, handling, storage, depreciation and insurance—makes his warehouse your stockroom.

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Want to check critical readings on small measuring tools?

Be accurate—use a Magni-Ray.

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Want to step up the speed and accuracy of your inspection department, particularly on small part inspection? **Use**Magni-Rays—as so many shops large and small, are now doing.

The Scherr Magni-Ray is far more than an ordinary magnifier. It **flood-lights** the work, with bulbs shielded against eye-glare. The lens is of true optical glass ground by experts, and large enough to enable two-eye seeing, without distortion on the edges.

The Magni-Ray is made in three models. Model A has a 3-in. diameter lens with a magnification of  $1\frac{1}{2}$  plus. Model B has a magnification of 3 plus, and gives a wide field of view without bringing the eye close to the lens. Model C has 3-in.,  $1\frac{1}{2}$  x lens, for inspecting large work.

Model C has a 5-in.,  $1\frac{1}{2}$  x lens, for inspecting large work. All models have a heavy base with lens adjustable for position. Lens and handle can be quickly removed from base and held in the hand, where conditions require. Write for bulletin giving full details.



This is the model C Magic-Ray. As with other models, it gives you the inestimable advantage of two-eye seeing, enabling the easy checking of surface finish as well as of form in the part inspected.

#### DIAL TEST INDICATOR



A superior instrument. Dust-proof case, unbreakable crystal. Stainless steel and bronze mechanism. Only 3 moving parts. Plunger hardened and ground. Dial adjustable for zero setting. Types with plain back or with universal ball joint. Various contact points. Clamp base or Scherr magnetic base which makes clamping unnecessary.

#### SINE BAR

Thoroughly normalized, and carrying the Scherr accuracy guarantee. Type G has ground edges. Type L, lapped edges. Two sizes—1" × %" " × 5". Extremely low price makes this valuable tool available for the individual owner as well as in quantity for the tool-room.





A 34-block set of standards giving 80,000 combinations in steps of 1/10,000". Set includes optical parallel for testing flatness and wear. Other sets, in sizes to meet all needs, and at interesting low prices.

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Call at our extensive show room and examine these tools as well as the Scherr line of production equipment demonstrated under power.

#### **NEW SMALL TOOL CATALOG**

Eight pages of data on these and other modern measuring tools, fully illustrated, showing how to check mikes for parallelism and flatness of spindle end and anvil. A valuable booklet FREE AT REQUEST.



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Independently powered, with 2 or 3 times the H.P. on overloads, Mall Heavy Duty Industrial Flexible Shaft Grinders are free of interference from other tools—operate at a constant high speed with maximum power delivered to the working tool—can be used for Grinding, Sanding, Wire Brushing, Snagging, etc. With the electric motor mounted on a floor stand or an overhead trolley, all motor weight is taken from the operator's hands—permitting a larger, more powerful motor. Available in 3 H.P. Geared Head Model (4500 r.p.m.); 3/4, 1, 1/2 H.P. Direct Drive Models (3450 r.p.m.); or 3/4 H.P. Countershaft Model (1650 to 7400 r.p.m.).

Ask your Supplier for Mall Grinders, MallDrills, Mall Screwdrivers and Mall Flexible Shafting or write Power Tool Division for literature. See our advertisement in The Saturday Evening Post—June 14th issue

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#### MALL TOOL COMPANY

7814 South Chicago Avenue

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26 Years of "Better Tools For Better Work"

# Save ASSEMBLY TIME

with the



### CIBRATO KNURLED HEAD

Reg. U.S. Pat. Off.

The "Unbrako" Socket Head Cap Screw with the Knurled Head saves assembly time, facilitates compact designs, reduces weight and cost. The Knurling provides a slip- and fumble-proof grip—even though the fingers and heads be ever so oily—therefore, it can be screwed-in faster and farther before it becomes necessary to use a wrench. The "Unbrako" Socket Cap Screw may also be a Self-Locker—ask us how.

Available in sizes from No. 4 to  $1\frac{1}{2}$ " in diameter and a full range of lengths—millions upon millions are in use throughout industry. Write for your copy of the "Unbrako" Catalog—very interesting and informative.

Knurling of Socket Screws originated with "Unbrako" in 1934.

You can't screw socket screws in or out without a hex socket wrench, so why not get our No. 25 or No. 50 "Hallowell" Hollow Handle Key Kit which contains most all hex bits.

"Unbrako" and "Hallowell" Products are sold entirely through Industrial
Distributors.

KITS: PAT'S PEND.

60



A prominent automotive manufacturer, using H.S.S. reamers for finishing close tolerance holes in cylinder blocks, found this operation lagging far behind in production. Due to the material being reamed, the tools became dull after running two to three hours, causing frequent down time for changing tools. Overtime did not eliminate the bottleneck, and a second machine was ordered for this operation.

Staples Tool Engineers recommended a trial using special Staples Carboloy-tipped Reamers. As a result, the operation is now run con-

tinuously for four days without a shut-down for tool resharpening—and the required work output is maintained without the addition of a second machine.

Tools that produce savings such as these are worth a trial in *your* production. Call in a Staples Tool Engineer for an on-the-job demonstration. There is no obligation.

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REAMERS • CORE DRILLS • SPOT FACERS • COUNTERBORES • END MILLS • SHELL END MILLS • ALSO A COMPLETE LINE OF CIRCULAR SPECIAL TOOLS

# Spartan\_ The New TOOL BITS

These Tool Bits will give you one grade for general industrial use and another for the extra special jobs





Made from special alloy high speed steel, have the strength and toughness for machining bronze, copper, aluminum, brass, cast iron, etc. These bits are furnished unground.

When the cutting requirement calls for economical general purpose cutting, you'll find they result in general satisfaction.

Made from a special high grade alloy steel that makes them especially adaptable for machining extremely tough and very hard materials, such as heat-treated steels, die and stainless steels, etc.

These Spartan ground tool bits have greater wear resistance than any other high speed type available.

"Spartans Cut Cutting Costs"

SPARTAN SAW WORKS, Inc., Springfield, Mass.



### **DuBo Gages are going over!**

Orders and re-orders demonstrate DuBo superiority over cylindrical plug gages



### DuBo\* Plug Gage

checks bores FASTER, more accurately!

Enthusiastic users all over the country are rapidly replacing cylindrical plug gages with DuBo Gages. The first use unmistakably demonstrates DuBo superiority—its extreme lightness, its ability to detect dimensional deviations (taper and out-of-roundness), its ease, speed and accuracy. STANDARD representatives in leading industrial centers will gladly arrange a demonstration for YOU.

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\*Patents Pending

SINGLE END

Sizes 1.510" to 6.010"

(38 mm. to 152 mm.)

DOUBLE END

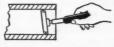
Sizes .240" to 1.510"

(6 mm. to 38 mm.)



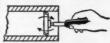
DuBo Gages weigh 70% to 80% less than cylindrical plug gages of equivalent size. Lighter weight means less fatigue, greater accuracy.

#### EASY TO ENTER



DuBo is entered easily by tipping handle slightly above bore axis (no jockeying necessary). Enters even under-sized bores easily.

#### DEFINITE CHECK



Enter gage, rock handle gently, bringing spherical gaging surface in contact with bore wall. Whether or not handle drops freely below center. is definite yes-or-no answer.

STANDARD GAGE CO., Inc., Poughkeepsie, N.Y.

### AIDS TO BETTER PRODUCTION

#### INDESTRUCTIBLE!

- NO MARRING NO CHIPPING
- NO REBOUND 
   NON-INFLAMMABLE
   HARD-HITTING



**NUPLA MALLETS** 

When Ordering SPECIFY: SOFT (Type XX); MEDIUM (Type A); HARD (Type B)

	STA	NDARD			HEA	VY DUTY	7
No.	(ALL I	Head Length Overall	Approx. Weight	No. 57	Head Dia. 1 <sup>7</sup> / <sub>8</sub> "	Length Overall 43/8" 51/4"	Approx. Weight 2 lbs. 1 1/4 lbs.
NO.	Dia.	Overall	weight	58	1 7/8 "	51/4"	1 1/2 lbs.
50	1"	33/2"	5 oz.	60	1 7/8" 1 7/8"	51/4"	3 lbs.
51	1"	33/8"	8 oz.	61	23/8"	51/4"	1 3/4 lbs.
52	1 3/8"	4"	8 oz.	62	23/8"	51/4"	3 lbs.
53	1 3/8"	4"	17 oz.	63	23/3"	53/4"	4 lbs.
54	17/8"	43/8"	15 oz.	64*	3"	61/4"	3 lbs.
55	1 7/8"	43/8"	24 oz.	65*	3"	61/4"	6 lbs.
56	17/8"	43/8"	32 oz.	*No. 64	and 65	have remov	

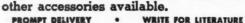
#### RECIPROCATING TOOL

#### PORTABLE ELECTRIC

Reciprocating Action—
"In and Out"

Motion is "in and out" not spinning or rotary. Tool is portable—light weight—carry it anywhere—easy to handle. Self

contained. Ready to plug into any 119 volt electric outlet. Use it to work on any metal, wood, plastic or other materials that may be filed, sawed or polished. Delivers 1000 strokes per minute, much faster than hand methods. Complete line of files, scrapers, hones and





ACME TOOL COMPANY

96 WARREN STREET

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Jet propulsion engines utilize very last fractional ounce of power. To achieve this, these tiny rotor blades must fit, with extraordinary precision, their appointed slots in the air compressor wheel. Only by broaching can the exacting tolerances required on both wheel and blades be attained with accuracy, economy and speed.

Seventy-eight angled slots are broached in the wheel by a Lapointe 15 ton, 66" stroke single ram machine, with a fixture designed to hold the piece at a 35° angle, and properly position it for the cuts.

Comparable to broaching's contribution in this new field is the way this modern method of machining is meeting the ever increasing demands of industry. Write Dept. 18 for 124 page Instruction Manual, containing full specifications on Lapointe machines.



THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHES AND BROACHING MACHINES

A PRESS

Speed

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Small Arbor Presses offer possibilities for increased production of many parts whenever a quick, easily applied force is needed. They may help your production problems in many ways in providing rapid assembly of parts.

Dake hand-operated Arbor Presses are designed to provide long operating life in any service. The square ram and spindle are specially heat-treated for extra strength and long life. And the wide variety of frame sizes available makes it easy to choose the right size press to meet your requirements.

Dake also offers a complete line of utility, hand-operated, hydraulic, and electric-hydraulic presses for use in production, repair, or parts replacement service. For full information, ask for the Dake Arbor Press Catalog.





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There's a
Dake Arbor
Press to meet
every requirement.
Presses range
from small
1-ton unitsup
to 50-and 70ton hydraulic
and Elecdraulic units.



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Company
Address

DAKE
ENGINE COMPANY

ARBOR AND HYDRAULIC PRESSES

### MANHATTAN RUBBER BONDED CENTERLESS WHEELS



#### HEAVY STOCK REMOVAL—ROUGH and FINISH with same wheel

Data from Test Files and Engineering Reports—Thru-Feed with 20"x6"x12" Wheels

Material	Hardened Steel Pins	Stainless Steel Bars	Soft Steel Bars	Shelby Tubing	Cast Iron Rolls
Size	1/4" to 1" dia. 4" to 6" long	.040/.400" dia. Mill lengths	3/8" to 5/8" dia. 10' to 20' long	1½" dia. 3' to 5' long	5/8" to 3/4" dia. 4" to 8" long
Passes and Removal	3 Passes 1st .006/.008 2nd .0035 3rd .0015	2 Passes 1st .010/.012 2nd .002/.003	2 Passes 1st .021/.023 2nd .005/.007	3 Passes 1st .005/.006 2nd .003/.004 3rd .002	2 Passes 1st to .070 2nd to .011
Hold Size	+.0001 0000	.0015 Taper 12' Bars	Very Well	Good	Good
Finish	Excellent	1st Pass Commercial 2nd Pass Polish	Good Commercial	Very Good	Fair
Specifications	4660 F15 KLE	80100 Q52 BV5	4660 FS8 BV9	6080 Q85 KLE	3646 FS78 KLE

REGULATING WHEELS — PLAIN — CORE MOUNTED

MANHATTAN CORE MOUNTINGS EFFECT SUBSTANTIAL SAVINGS



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Keep Ahead with Manhattan

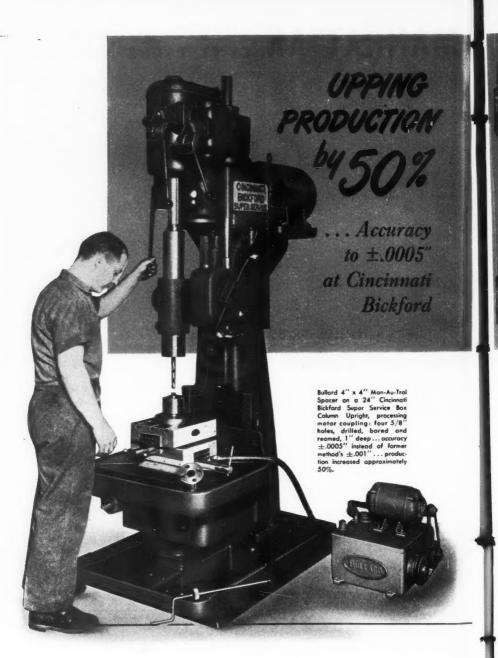
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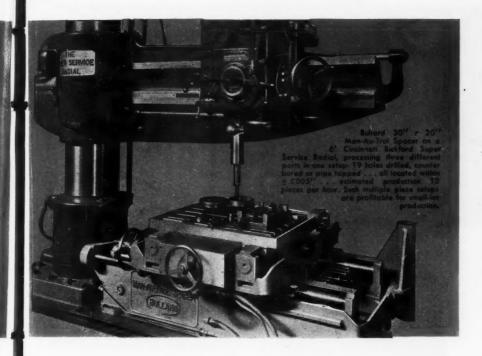
PASSAIC, NEW JERSEY

June, 1947

MODERN MACHINE SHOP

67





### New Bullard Man-Au-Trol Spacers Eliminate Hole-Locating Jigs and Fixtures

Bullard MAN-AU-TROL Spacers now on the production line are more than living up to their advance notices. Machines and men formerly tied up on the non-productive work of making hole-locating jigs are now doing the kind of productive work that cuts operating overhead, develops competitive price advantages and steps up profit. Drilling, boring, reaming and tapping volume and accuracy are reaching new peaks...while operators fatigue is measurably teduced.

To bring yourself up to date on this revolu-

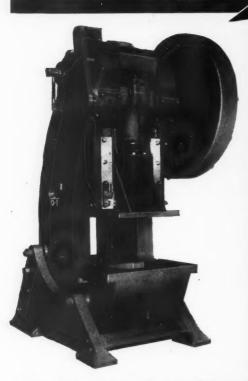
tionary new hole-locating method, write for the MAN-AU-TROL Spacer Bulletin. The Bullard Company, Bridgeport 2, Connecticut.



CREATES NEW METHODS
TO MAKE MACHINES DO MORE

### CLEVELAND Inclinable PRESS

# 150 tons Capacity



This big ruggedly constructed, compactly designed, No. 13-1 Cleveland Inclinable Press is arranged with an electrically controlled, air operated friction clutch and brake.

The Press, which exerts a pressure of 150 tons, has a stroke of 6 inches, adjustment 10 inches, bed area 30 inches x 45 inches and operates at 33 strokes per minute.

The Clutch, Flywheel, Brake and Motor are mounted between the uprights and the gears, which run in oil, are fully enclosed in oil tight guards.

Other Presses of this series in-

11-1, 110 tons; 10-1, 90 tons; 9-1, 75 tons; 8-1, 60 tons and 7-1, 45 tons.

If interested in Inclinable Presses write for a copy of our Catalog

TO INSURE ACCURACY, USE -

SOUTH BEND

Precision

LATHES



Equip Your Lathes with Complete Sets

A complete set of collets is especially helpful for toelroom and maintenance work. Often the time saved in getting out a single rush job without having to wait for a specially ordered collet will more than compensate for the cost of a full set of collets. South Bend Collets are made in four types, and are available in either steel or brass. Each collet is carefully inspected and tested before it its packed for shipment.

South Bend Lathes help to increase plant efficiency and profits by raising precision standards both in the toolroom and in the production shop.

These lathes are designed and built to work to close tolerances and produce a smooth finish, for ease and speed of operation, and to give long, dependable service. Versatile, too, they are capable of performing a wide variety of operations on all types of machinable materials with a minimum of change-over and set-up time. Attachments are available which help to simplify and speed tooling for special classes of work, and in many instances eliminate the need for special fixtures.

South Bend Engine Lathes and Toolroom Lathes are made with 9'', 10'', 13'', 141/2'', and 16'' swings, bed lengths to 12', and collet capacities to 1''. Precision Turret Lathes are made with collet capacities to 1''. Write today for Catalog 100-D which illustrates and describes the complete line of lathes and accessories.

LATHE BUILDERS SINCE 1906

SOUTH BEND LATHE WORKS
427 EAST MADISON STREET . . SOUTH BEND 22, INDIANA



## Bridgebort

#### TURRET MILLING MACHINE

THE ERIDGEPORT TURRET MALING MACHINE his wan entversal acceptance. It has proved a most valuable time and later saver in the tool rooms and production departments of the largest plants, its wide range and versability in milling, drilling, bering and shaping anoble it to serve as the complete control machine around which all operations revolve in many stall chape.





BRIDGEPORT MAGHINES, INC.

52 REMER 51. BRIDGEPORT, CONN.

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the pic

### Two deep cuts in seven pieces ... under difficult holding conditions THAT TAKES GOOD CUTTERS



type, bigh speed steel) . . . Differ from regular helical milling cutters only in having spiral angle decreased at one end to permit forming strong end teeth. They make a slabbing cut and an end cut at one pass of the cutter. Can be supplied to order with either right-or-left-hand spiral and with end teeth of squared, chamfered or rounded corners.





Here's the kind of run-of-the-

mill work that puts it up to the cutters. Two cuts, each 21/4" x 5/8", are being taken simultaneously in seven rectangular pieces. And the cutters must cut cleanly because the work pieces are difficult to hold—having rounded bottom edges and small holding surfaces.

Climb milling with Brown & Sharpe

Cutters makes possible these generous size cuts while work is held in the special jaws of a stock vise.

Brown & Sharpe Milling Cutters are expertly designed and made of finest steels to precise standards—they give maximum production with accuracy—more cuts between sharpenings. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.





BS We urge buying through the Distributor



- inders faster than any other method.
- Assures highest degree of accuracy with any surface finish desired.
- Produces straight, round, smooth bores to working tolerances as close as .0002".
  - Wide range of spindle and reciprocating speeds permits honing small or large diameters.
    - 5 Oversize capacity gears and bearings permit continuous operation under heaviest loads.
    - Simple to operate. Inexperienced operators can obtain precision results.
- Patented Fulmer Control System places all controls at "floor level", in front of machine, within easy reach of operator.
- Patented Fulmer "Stop and Dwell" system permits honing up to internal shoulders or to the head end of blind cylinders.
- Exclusive Fulmer Sump System collects over 90% of the sludge.
- 10 Uses any make of conventional honing heads.

#### C. ALLEN FULMER COMPANY

1233 First National Bank Bldg., Cincinnati, Ohio

HONING MACHINES PISTON RING LAPPERS CENTRIFUGAL CASTING MACHINES

DEALERS: A few attractive territories remain open. Write today!



## WHEN COSTS AND QUALITY COUNT THE New 918-S TURRET LATHE

If you machine small and medium sized parts from bar stock or on second operations — look to this new Rivett Turret Lathe. It is designed to buy its way into your plant with cost savings and quality control.

The 918S Turret Lathe cuts the initial cost of investment by taking work from larger machines. It follows by reducing the "dead time" of set-up and spoilage on

Stationary Collat — closes without lateral movement to maintain perfect lengths on bar stock. Maximum capacity 1/4" round.

Draw-In Collet — new design holds work truer with greater gripping power. Maximum capacity 11/6"

Stop Chuek — for accurate chucking of circular or irregular parts requiring only a short grip. Maximum capacity 6" round.

every job. Then it really pays with lowered time on every piece. How? — With the right spindle speed for efficient tooling, with quick means for chucking work, with properly grouped control levers and by reducing operator fatigue.

Features designed into the 918S Turret Lathe to guard quality include a rigidly mounted precision ball bearing spindle, precise took indexing, hardened and ground steel bedways, vibration-free drive and mounting.

Write for Bulletin 918-ST

RIVETT LATHE & GRINDER, Inc.

BRIGHTON . BOSTON . MASS . U S A

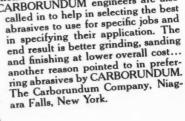
#### A BUYING GUIDE FOR ABRASIVES

Point No. 5

## **Product Application**

Supplying abrasives of highest quality is but one way in which The Carborundum Company serves industry. Considered equally important by many users is the attention directed to correct use of these products. For this purpose The Carborundum Company has established a special group of product application engineers.

This group studies, appraises and charts abrasive applications. New improved methods and better abrasive products are often turned up. CARBORUNDUM engineers are also





A Good Rule for Good Grinding



... CALL IN

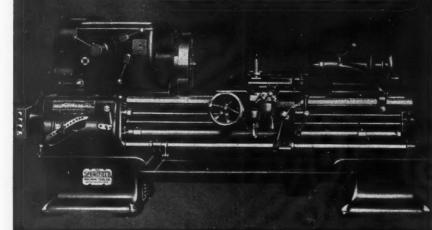
● BONDED ABRASIVES ● COATED ABRASIVES ● ABRASIVE GRAINS AND COMPOUNDS



Tool Room Lathes have lead screw reversing mechanism which produces right and left hand threads and feeds with automatic stops for both lead screw and feed rod.

Deep, well ribbed lathe bed of high test nickel chrome gray iron assures extreme accuracy and long life.

Ground gears and up-to-date oiling systems on all sizes. Write for Bulletin 162.



HE SPRINGFIELD MACHINE TOOL CO.

SPRINGFIELD



## More and More — they Re-tool with Reltool

The gradual, orderly expansion of the Reltool line has resulted in constantly increasing recognition and demand for these reliable metal cutnition and demand for these reliable metal cutnition.

of styles and sizes.

Today, more and more plants re-tool with RelToday, more and more plants re-tool with Reltool because standard Reltool products are detool because standard Rollool products are demetal cutting operations.

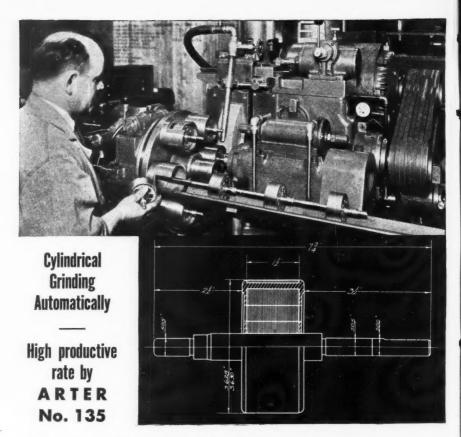
## INDUSTRIAL DISTRIBUTORS he Reltool Franchise is

The Reltool Franchise is still available in A Few Choice Territories to those who can provide Adequate Sales Representation for the expanding Reltool Line.

Reliable METAL CUTTING TOOLS

710 WEST MICHIGAN STREET

MILWAUKEE 3. WISCOME



A drum or carrier, hand loaded, brings the work between two live work spindles. Either work centers or collets pick up and drive the work. Dogging and handling time saved. A wide wheel, oscillating slightly, plunge-cut grinds the work.

The grinding of the diameter of the laminations of an armature for a washing machine motor is one of the many jobs on which this machine is giving typical ARTER satisfaction. Production—200 pieces per hour. The central taper shaft diameter is ground before assembly with a production rate of 300 per hour.

#### ARTER GRINDING MACHINE CO.

WORCESTER, MASSACHUSETTS . U.S.A.

(Commercial and Precision Ground)

lanned Economi

Millim

In the highly competitive race to capture today's markets the visionary manu-facturer resorts to careful long range planning. New Material... New Methods ... and New Equipment demand an increased productivity at lowered costs. In order to keep pace with these new developments the tool manufacturer must continually improve his product and services. We are now offering to the consumer a new and improved line of commercial and precision ground taps at popular competitive prices. A careful scrutiny of every SCHRILLO tap reveals the meticulous care that results from an honest and conscientious effort.

Add greater value to your tool dollar .. Reduce the cost per tapped hole ...

Specify SCHRILLO.

Quotations on Special taps, Cutting tools and Gages given upon request. Consult our local representative for prompt and courteous service.

WRITE for catalogue No. 14 (on company letterhead, please). It is a complete hand book compiled for the designer, purchaser and user of taps and tapping equipment . . . .

SCHRILLO

11-15 MELROSE AVENUE

LOS ANGELES 46. CALIF.



## TAKE THE TOOL TO THE WORK BRING THE WORK TO THE TOOL



THE U. S. LINE is so varied and comprehensive that production and maintenance are served with satisfaction both by the portable as well as the fixed position items in

## UNITED STATES ELECTRICAL TOOLS



#### **PORTABLE**

Drills Grinders Surfacers Polishers Sanders Tappers Saws Hole Saws

#### BENCH AND FLOOR

Grinders Buffers Polishers Valve Seat Grinders Valve Refinishing Shops Flexible Shaft Machines

AND OTHER TOOLS



#### BUFFER AND POLISHER

Motor in base Model 110

For polishing and burnishing. Practical and economical; eliminates outlay in cycle changing equipment and waste in power transmission.

The UNITED STATES ELECTRICAL TOOL Co.

CINCINNATI, OHIO



#### UNIVERSAL QUICK CHANGE DRILL

...with 12
INSTANTANEOUS CHANGES
OF SPEED
AND WITH SELECTIVE FEED

It's heavy, rigid and versatile... this Baker Drill of the Universal Quick Change type. Assures maximum out of twist drills up to 1½" diameter. Used for heavy duty boring and facing as well as for drilling.

Shown here is Model 150 with standard compound table. Speed and feed changes convenient to operator. Baker-built dependability... engineered to do the job better and help increase productivity. Write for more details.

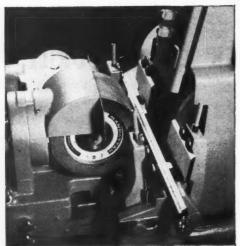


MACHINE TOOL SHOW
Chicago—Sept. 17-26
BOOTH 639 & 681

BAKER BROTHERS, Inc., Toledo, Ohio

DRILLING, TAPPING, KEYSEATING and CONTOUR GRINDING MACHINES

### SAVE 75% - 90% of SET-UP TIME



CENTERLESS GRINDING...

## PORTER-CABLE Centerless BELT GRINDER

...Eliminates Truing, Balancing
...and Continued Wheel Dressing



SINCE the Contact Roll is behind the endless abrasive cutting belt, it is not subject to wear. Therefore, it always has a flat, smooth, true-running surface and square edge. It does not nick, round or chip. Furthermore, its resiliency eliminates chatter . . . compensates for irregularities of stock.

For different size stock (3/32" to 21/4" dia.), simply insert the proper Work Rest, and advance or retract the Regulating

Wheel Assembly to or from the abrasive belt. This Porter-Cable Model L-4 makes possible simple, fast, true set-up in just a few minutes!



#### Save Money!

Any small or large shop can afford the L-4, now sold at a revolutionary low price!
Write today for full information. Ask for new film on Abrasive Belt Grinding: "A Machine of the Age," loaned FREE!

## PORTER-CABLE

300-6 Wolf St., Syracuse 8, N. Y.

## With SUNNEN PRECISION HONING You Can Produce Holes with

## Accuracy to .0001"

## at Low Cost

Used on thousands of parts, the Sunnen Precision Honing Machine finishes parts quickly and more accurately. Parts last longer and there are fewer rejects—even when tolerances are as close as 1 to 2 ten thousandths.

Produces holes straight and true; corrects errors of taper and out-of-roundness; align-hones two or more holes of the same size; accurately duplicates sizes.

To hold very close tolerances on those "difficult" jobs—or produce better than usual finishes—the Sunnen Precision Honing Machine does the job rapidly and economically.

Write for Bulletin XMAN 5000, or ask a Sunnen engineer to call and show you how Sunnen Honing can be used in your plant.



- Size range .120" to 2.625" in diameter
- Low in cost economical to operate.
- Does not require skilled labor.



#### SUNNEN PRODUCTS COMPANY

7933 Manchester Ave. • St. Louis 17, Missouri Canadian Factory: Chatham, Ontario



The Sunnen Precision Howing Machine is used on parts like these .



Bronze Valve. The Sunnen method of honing is used to secure a high finish and accuracy.



Compressor Yoke.
Alignment maintained and better
finish produced.



Hydraulic Two-Way Control Valve. Hole is honed to eliminate leakage.



Drawing and Blanking Die "Saves time in producing smooth base metal finish."



Mild Steel Clevis. Honing corrected errors of previous operations and maintained true alignment of two holes.

#### THIS IS DUPLITROL

#### ... FOR MAKING REPETITIVE PARTS WITHOUT JIGS!

2 34 x 34 C.R.S.

34 x 34 C.R.S. BARS

ONE HORIZONTAL ONE VERTICAL

holes machined at the desired spacing.

2

HARDENED

PINS

...used to select locations according to the desired pattern of holes. Automatic

POSITIONING

... accurately and dependably provides foolproof spacing for machining repetitive parts without jigs. = DWPLI ROL

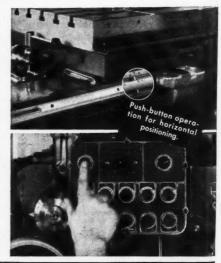
The finest known process for accurately spacing and machining holes.

#### THIS IS HOW IT WORKS . .

Illustrated at right is one vertical bar and one horizontal bar with pins used as masters on the 3B DeVlieg Duplitrol Equipped Jigmil. Below are illustrations showing how all spacing is done in response to push-button operation.







DevLIEG MACHINE COMPANY



450 FAIR AVE. FERNDALE 20, (Detroit) MICH.

86

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#### from coast to coast for your convenience

BUCKEYE'S 1088 SIZES of fully finished readyto-use bearings,—156 sizes of semi-finished cored bars turned on the OD only, and 256 sizes of rough cast bars are regularly stocked in the leading industrial markets for your convenience.

Manufactured from selected materials under Buckeye's rigid controls, these bearings measure up fully to Buckeye's exacting specifications. Each is a quality product, free from porosity, and accurately dimensioned, assuring speedy, easy assembly and long efficient service. Send for the Buckeye catalog and order Buckeye Bearings by name from the Buckeye distributors.

BADGER BALL & ROLLER BEARING - MINWAUKOO, WIE.

BOBKER BEARINGS - JOTSAY CITY, N. J.

BURHANS & BLACK, INC. New York, N. Y.

CARTER, MILCHMAN & FRANK, INC. New York, N. Y.

CRASS, MILCHMAN & FRANK, INC. New York, N. Y.

CROSS, BROWN & Rochestry, N. Y.

A. M. LEU SALES - M. C. O. Cambridge, Mass.

LEU SALES - M. C. NIC. Seriagoport, Comp.

METALS SUPPLY CO., INC. Seriagoport, Comp.

S. M. POOLEY BELTING CO. Dakiand, Calif. Serial Street, N. Y.

SLAYSMAN CO. Sertile, Wash.

STRONG, CARLISLE & HAMMOND CO. Clivation, M.

TRISTATE CORP.

WESTERN BRASS WORKS - Philadolphia, Pa.

WESTERN BRASS WORKS - Philadolphia, Pa.

WESTERN BRASS WORKS - Los Angolos, Calif.

## Buckeye

BRASS AND MANUFACTURING COMPANY

6412 HAWTHORNE AVE.

SINCE 1900

CLEVELAND 3. OHIO

BRONZE SLEEVE BEARINGS - STANDARD SIZES OR TO CUSTOMERS' BLUEPRINT
IN ANY RECOGNIZED BEARING METAL ANALYSIS



**Built Into** 

## SHAPE-RITE SHAPERS

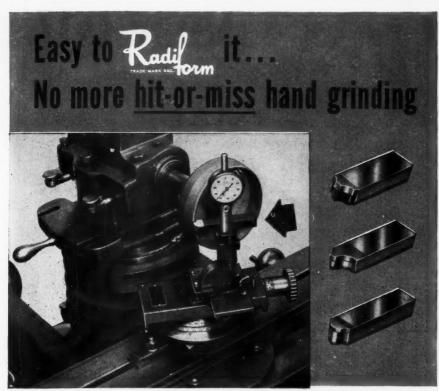
You can depend upon the built-in accuracy and durability of Shape-Rite Shapers to withstand day-in and day-out capacity production. The speedy set up features and ease of operation will increase the output of precision work. Shape-Rite Shapers are Versatile, and will handle any type of work within the capacity of eight-inch stroke Shapers. Unexcelled for Tool and Die Makers and small instrument manufacturers.

Complete Specifications on Request Write to Dept. M-6.

## Sales Service Machine Tool Co.

2363 UNIVERSITY AVE. ::

:: ST. PAUL 4. MINN.



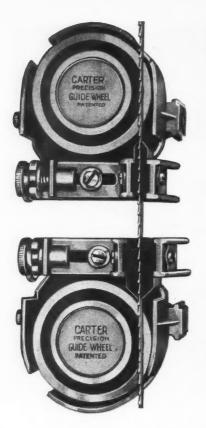
PATENT PENDING

The Meyers Radiform method is the modern way to reduce the time and cost of grinding intricate, high-precision form tools. Radiform eliminates the uncertainty of tedious, time-consuming hand grinding—at best a very costly, "hit-or-miss" method. You are always assured uniformly accurate results.

New, low prices for the Radiform have just been released. So write today for revised price list and complete information showing examples of how the Radiform can simplify your complex, expensive grinding operations.

Note: A number of good territories are open to qualified distributors.

W. F. MEYERS COMPANY . ESTABLISHED 1888



## **MODERNIZE**

your

BAND SAWS

with

CARTER

MICRO GUIDE PRECISION

GUIDE WHEELS

which

enable you to safely speed your bandsaw wheels to 1800 rpm without fear of blade breakage or freezing and burning of bearing surfaces. Carter Guide Wheels will attain the amazing speed of 27,300 rpm. Increased speed and improved quality of work are definitely insured by installing Carter Guide Wheels.

Carter products are nationally recognized as precision equipment for the modernization of lumber and woodworking equipment.

WRITE TODAY FOR PARTICULARS on Carter Guide Wheels, Carter Rigid Band Saw Wheels and Tires, and the Carter Guide-Line Light.

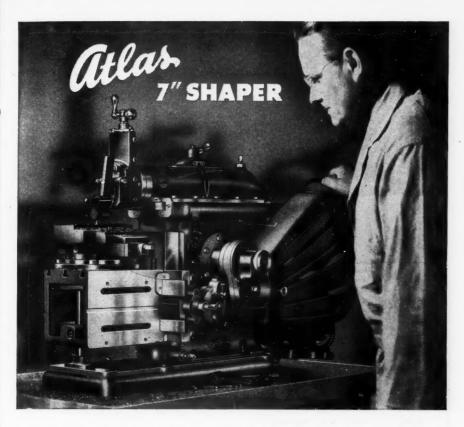
## CARTER

PRODUCTS COMPANY

959 Michigan Trust Bldg., Grand Rapids 2, Mich.

### FEATURES which Benefit You!

- 1. Speed up to 1800 RPM
- 2. Greater Precision
- 3. Saves Saw Breakage
- 4. Saves Machine Time
- 5. Reduces Labor Cost
- 6. Most Modern Bandsaw Machines have these items as standard equipment
- Modernizes your Bandsaws for greater productivity



#### BUILT TO MAKE MONEY for YOU-

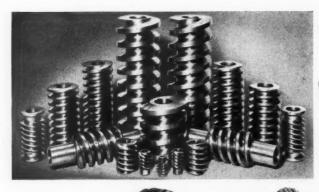


Most shaping operations in shop or tool room are within the 7" stroke of an Atlas shaper. That is why its compact size is such an advantage. It saves on set-up time, saves on machine hour cost, saves on power. Savings that quickly translate into profits.

The Atlas shaper handles close tolerance work to perfection. Gives you a selection of cutting strokes between 45 and 186 per minute, speeds from 3½ to 116 fpm. It is Timken bearing equipped. Operates from ½ HP motor. Send for catalog with complete specifications and operating details.

ATLAS PRESS COMPANY
646 N. PITCHER ST. KALAMAZOO 13D, MICH.

46 N. PITCHER ST.







#### the ADAMS line

SPUR GEARS HELICAL GEARS BEVEL AND MITER GEARS WORMS AND WORM

GEARS **SPROCKETS** 

INTERNAL GEARS (Spur and Helical) RATCHETS SPLINED SHAFTS

RACKS LEAD AND FEED

**SCREWS** GROUND TOOTH

GEARS (Spur and Helical)

SHAVED TOOTH GEARS (Spur and Helical)

GROUND THREAD WORMS

## Are you looking for ways to improve your product?

Check these advantages of Adams custom made gears:

- Made by skilled gear craftsmen.
- Cut on modern precision machines.
- Careful inspection and control throughout manufacture.
- Exact conformance with your specifications.

Adams gears are made to suit the particular requirements of your product and to make that product perform as efficiently and dependably as possible. Investigate the advantages of Adams custom made gears for your needs. Write THE ADAMS COMPANY, 1942 Cypress St., Dubuque, Iowa.

## The ADAMS Compa

Dubuque, Iowa, U.S.A.

ESTABLISHED 1883

FINE GEARS MADE TO YOUR SPECIFICATIONS





## **Fluidmotion**\* Radius and Angle Dressers save time in ACCURATE FORM DRESSING

FLUIDMOTION", an exclusive J & S development, automatically blends any combination of angles and arcs in one continuous motion, with one setting, using one handle. Produces clean, precise form without tool or chatter marks. Available in models C, E and F... also the Form Master, an accurate lower priced dresser. Send for folder.

#### **Fluidmotion Features**

- e automatic centering
- .0001" accuracy
- e one setting per form
- e 14" wheel capacity
- large radius range
- dustproof
- chatteriess



MODERN MACHINE SHOP

June, 1947



## HARDNESS is <u>not</u> a FUNDAMENTAL STANDARD

Fundamental standards length, mass and time—are determined by comparison

with measurements set by statute. There are no such "standards" to measure hardness. But...

MADE THE

After a "ROCKWELL" Hardness Tester leaves our Standardizing Laboratory, it is perfectly capable of setting and maintaining its own standard, according to the universally accepted "ROCKWELL" Hardness scale.

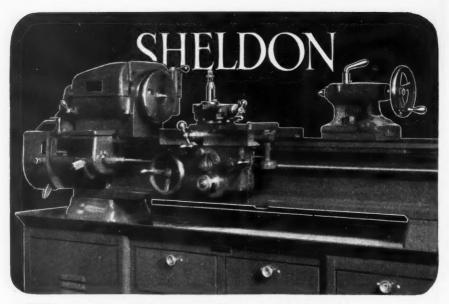
Remember, the "ROCKWELL" Hardness Tester is made only by Wilson. And Wilson makes only hardness testers.

WILSON MECHANICAL INSTRUMENT CO., INC. ACCO

AN ASSOCIATE COMPANY OF AMERICAN CHAIN & CABLE COMPANY, INC

230-G PARK AVENUE, NEW YORK 17, N. Y.





What do they say? We asked the users why they preferred the Sheldon S-56 Lathe. They said:

the bearings large.

"Large hole in spindle"-There's a 13/8" hole thru the spindle.

"Collet Capacity" and "Extra Capacity"-It has 1" collet capacity and 111/4" swing.

"The drive"-4-speed (8 spindle speeds) V-belt underneath motor drive, has double Vbelts to the spindle that minimize power loss.

"It's really accurate, does real pre- | bearings.

"It's rugged"-The bed is heavy, | cision work"-Ways, lead screws, spindles, etc., are held to the very closest tolerances.

> "The S-56 is big enough to handle most lathe jobs, still is low enough in price for my shop"-Only complete tooling and newly developed special machinery make it possible to build so fine a lathe at S-56 prices.

> In the new TRB-S56 you get all this and in addition an even heavier headstock with "Zero Precision" tapered roller spindle

Write for circular

Manufacturers of Sheldon Precision Lathes . Milling Machines . Shapers 4250 N. KNOX AVENUE . CHICAGO 41. ILLINOIS. U. S. A.

## Outstanding News!

Latest Lenox Development
METAL CUTTING SLITTING SAWS



## CONCAVE SIDES HIGH SPEED STEEL

Well-designed teeth. Concave sides ground accurately for proper clearance. A Lenox Quality Tool in all respects.

ALL SIZES FROM 11/4" TO 10" Shipped immediately from stock

AMERICAN SAW & MFG. CO., SPRINGFIELD 1, MASS.

Hack Saws - Band Saws - Flat Ground Stock - Tool Bits - Slitting Saws



SWIVEL BASE
MILLING
MACHINE
VISES

## MASTER\$38.00

Jaws: 6½" wide, 2" deep.

Opens 4" with jaws, 5¼" without.

Wt. complete with crank, boxed, 85 lb.

## IUNIOR \$28.35

Jaws: 4½" wide, 1¾" deep.

Opens 3" with jaws, 3½" without.

Wt. complete with crank, boxed, 35 lb.

STEEL JAWS
Suited to drill press and shaper work.

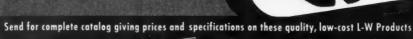
GRADUATED BASE

Can be used plain or swivel.

LARGE ACME STEEL SCREW
Contributes sturdiness and durability.

FOUR BOLT AND KEY SLOTS

are provided for rigidly attaching to
machine table so that work holding
surfaces are at true right angles
or parallel to table.





L-W CHUCK COMPANY 28 SO. ST. CLAIR ST. TOLEDO 4, OHIO

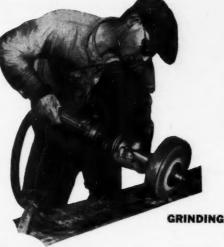
98

# WELDING SPEEDS FABRICATION AIR TOOLS SPEED WELDING

#### CHIPPING



COMPRESSORS - AIR TOOLS - ROCK DRILLS TURBO BLOWERS - COMDENSERS CENTRIFUGAL PUMPS - OIL AND GAS ENGINES



Modern practices for producing good sound welds put equal emphasis on the preparation for welding the welding—and the finishing of the weld. Highquality welds require careful performance of all three phases.

Ingersoll-Rand Air Tools have contributed to the advances in welding, especially by improving the preparation and finishing operations.

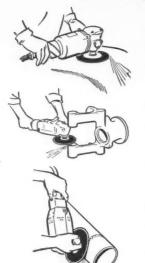
Improve and speed up your welding and satisfy your welders with 1-R CHIPPING HAMMERS for peening, beveling, root chipping, cleaning off excess metal . . . GRINDERS for cleaning, smoothing, polishing, wire brushing . . SCALERS for cleaning, removing excess metal and spatter . . . DRILLS for studding . . . AIR HOISTS for handling heavy weldments.

In most instances our branch offices can fill your order from their stocks—call them on the phone and start using I-R Air Tools today.

Ingersoll-Rand



metalworking with the New ARMOURCLAD RESIN FIBRE DISC!



Actual production tests have proved that this new disc cuts faster. This greater initial rate of cut lowers production costs, reduces labor costs.

The new Armourclad Resin Fibre Disc cuts faster longer because its special resin bond gives better grain adhesion-greater resistance to heat and humidity.

Better for all disc operations, the new Armourclad Resin Fibre Disc is especially good for severe grinding jobs.



Look for This Label on the Green-Backed Disc

ARMOUR Sandpaper WORKS

Division of Armour and Company

1355 WEST 31ST STREET

**CHICAGO 9, ILLINOIS** 

#### JOB SHOP STANDARDIZES ON . .



## MULTIPLE-SPINDLE AUTOMATICS



#### TYPICAL PARTS PRODUCED

(A) Stainless Steel Pipe Fitting from 1½" round, type 430 S. Stock. Time: 31 sec. per piece.

(B) Tapered Steel Roller from 1½" round, SAE 4620 stock. Time: 55 sec. per piece.

(C) Hex nut ¾" from B1113 stock. Time: 8½ sec. per piece (Dual set-up).



GREENLEE BROS. & CO. 1886 MASON AVE. ROCKFORD, ILLINOIS

#### SMALL LOTS HANDLED PROFITABLY BY SCREW MACHINE PRODUCTS CO.

Here is more evidence indicating the unusual adaptability of Greenlee Automatics for handling short run screw machine jobs. At Screw Machine Products Co., Milwaukee, 50% of the work produced in 1946 by this battery of 4- and 6-spindle Greenlees consisted of runs between 1,000 and 10,000 pieces. Stock sizes ranged from ¼" to 2%" in diameter. Quick change-overs in set-ups and economical tooling were a "must" in meeting competitive market conditions. The experience of this company with the savings made by Greenlee Automatics dates back to 1939 when a 1" 6-spindle machine was installed. Today, the 16 Greenlees in a standardized set-up handle a thriving job shop business.

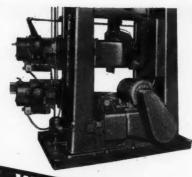


WRITE FOR MORE FACTS - SEE MOVIE

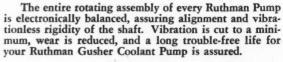
Send for a copy of 20-page book explaining timesaving and cost-saving features of Greenlee Automatics. Ask to see new 40-minute sound movie showing the building of a Greenlee "6" from foundry to finished machine:

MULTIPLE-SPINDLE DRILLING, BORING, TAPPING MACHINES . AUTOMATIC SCREW MACHINES . AUTOMATIC TRANSFER PROCESSING MACHINES





#### RUTHMAN GUSHER COOLANT PUMPS



Illustrated on the left is a Hammond 6" Model VH-6 Abrasive Belt Grinder equipped with a Model 1-P3-1/10 HP Short Ruthman Gusher Pump. On the right is a Cincinnati Planer Company 64" Vertical Boring and Turning Mill equipped with a Model 11023-A Long Ruthman Gusher Coolant Pump. Follow the leading manufacturers of machine tools and equip your machines with Gusher Coolant Pumps.

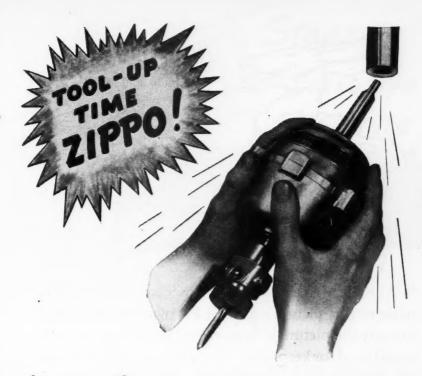
Write for Catalog 10-F



Model 11020

1817 Reading Road

Cincinnati, Ohio



## Ettco-Emrick

#### **TAPPING ATTACHMENTS**

Just slip one of these relatively inexpensive tapping attachments into the drill press spindle and — zippo — you're tooled up for high production tapping. And they'll give you clean, accurate threads at highest practical tapping speeds with full protection from tap breakage and work spoilage. Quill Clamps are available to provide absolute rigidity. For full details, WRITE FOR BULLETIN No. 2.

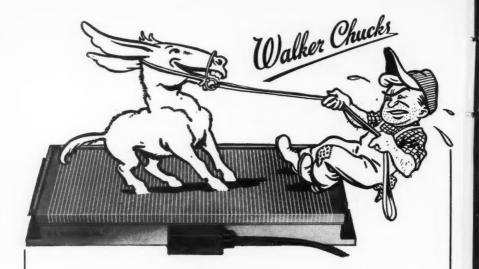
#### ETTCO TOOL CO.

598 Johnson Ave., Brooklyn 6, N. Y.

Detroit 1

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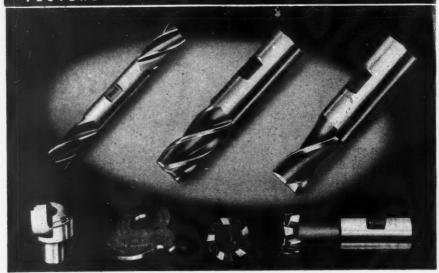
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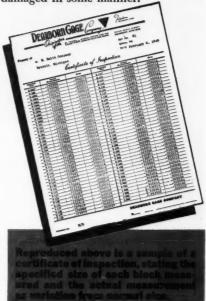
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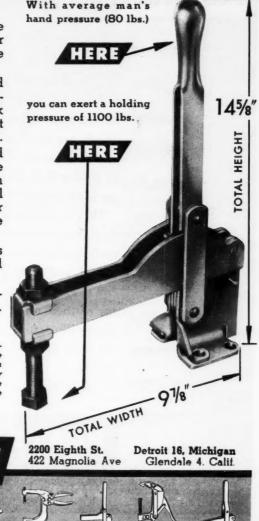
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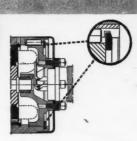
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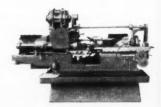
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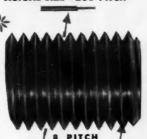
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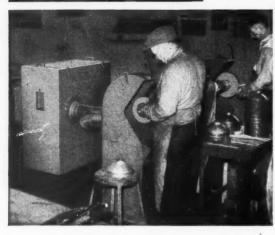
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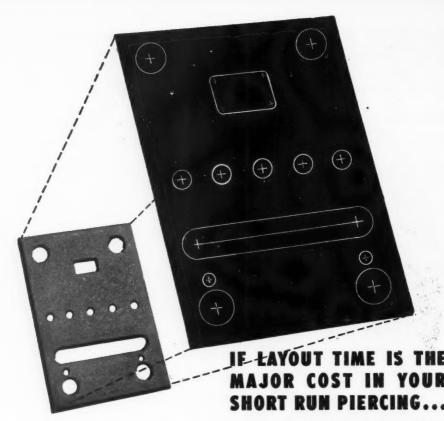
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#### Don G. Gardner

1889 - 1947

ON G. GARDNER, President of Gardner Publications, Incorporated, died May 15, 1947.

Born in Monticello, Indiana, Mr. Gardner spent his early life in and near that section. In 1911 he entered the publication field as a space sales-

man, working first on various newspapers and later on industrial magazines. In 1919 he became Southwestern Manager of Iron Age, leaving that position in 1928 to organize the company which bears his name.

This company was founded primarily to publish Modern Machine Shop, but as the years passed and the need for an additional magazine to serve the metal - finishing field

seemed obvious, the decision was made to establish the magazine Products Finishing. This was done in 1936. Again, in 1940, an opportunity for service both to the industrialists in the Latin-American countries and the machine tool and plant equipment manufacturers in this country became apparent, and the magazines El Taller

Mecanico Moderno and Oficina Mecanica Moderna were born. Under Mr. Gardner's guidance all of these magazines successfully have assumed the tasks that were allotted to them.

Mr. Gardner knew personally practically every manufacturer in the plant

equipment and machine tool field, and was one of the organizers of the Cincinnati Industrial Advertisers' Association. He made several trips to the Latin-American countries in order to survey the market possibilities there for Americanmade tools and equipment, and had been called upon to discuss this subject before a number of interested groups. His untiring energy was always at



DON G. GARDNER

the service of the industry with which he was identified.

His friends and associates mourn his passing, and it is a tribute to the excellence of his management that the company which he founded will carry on, adhering in the future to the policies that have guided it in the past.



Gerald Robechaud, Vice President in charge of Tooling, McCulloch Motors Corporation, discusses Plant Layout Problems with John Ryde, Chief Engineer

By
GILBERT C. CLOSE

# Tooling "Short-Cuts" Speed Engine Production

In which the author presents some of the tools and methods used in the manufacture of McCulloch motors.

SOLUTIONS to problems involved in efficient planning for mass production frequently also comprise the solutions to problems associated with sternly competitive trade conditions. This fact was kept constantly before the management and engineers of McCulloch Motors Corporation during the designing, planning and tooling of their new plant at Los Angeles, California, to produce a line of lightweight gasoline engines. The same fac-

tor dominated pre-production product planning, and is constantly kept in mind during research for future product development.

The net result of this careful forethought is a highly efficient system of materials handling, a number of costsaving production line short-cuts, and a product that requires a minimum of processing prior to its arrival in the shipping department. By their very nature, these accomplishments aid in the maintenance of quality in the product. Furthermore, research may be geared so that future developments will blend profitably with existing plant facilities, thus eliminating extensive retooling every time a change in product design becomes imperative.

The plant was built, practically speaking, around the production lines. Before work was begun on the factory buildings the departments were laid out on the basis of the proposed production operations. Miniature replicas of every machine to be used were superimposed on a floor plan layout and were carefully studied to make sure that they were in the proper sequence according to the production operations, that sufficient space was allowed for the efficient operation of the machines, and that the machines were so located that the parts could be passed or conveyed from one operation to the next without extra handling.

Efficient utilization of floor space was thus assured, and designs were developed for an overhead conveyor sys-

tem by which materials handling would be minimized. The conveyor system proved well worth the time and study involved in planning it. eliminates the possibility of bottlenecks due to lack of parts and materials at the point of use, and by the accumulation of finished parts at other points.

Purchased parts flow directly from the receiving department to their correct places adjacent to the production lines. There is no random shunting of materials through various departments to save a few feet of conveyor line installation.

Finished bearings, for example, travel direct to the final assembly line, while connecting rod forgings move direct to the starting point of the connecting rod machining line. Parts from the die casting and other initial production departments are routed to the pre-assembly operation points, and thence to their proper stations on the final assembly line.

Engine production is pivoted around the aluminum die casting department. This pivotal approach is logical inasmuch as the engines are designed to incorporate as many die cast parts as possible, and factory tooling is largely limited to finishing operations on die cast parts. All engine parts except

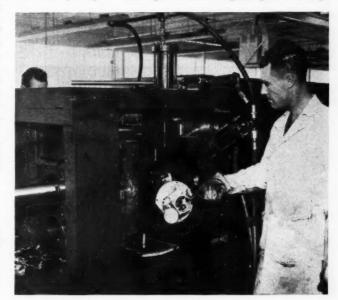


Fig. 1 — Crankcases are die-cast in this Reed Prentice No. 3G Machine. This workpiece requires a fourpiece die with three inserts, and is produced in four separate draws.

such obvious components as connecting rods, crankshafts, cylinder liners and bearings are produced in this manner. The speed and efficiency of the aluminum die-casting process contributes largely to the economy of the company's mass production efforts.

According to Gerald Robechaud, vice-president in charge of tooling, when all possible phases of small engine production are centered around the aluminum die-casting process, a single unit of plant labor will produce as many finished engines as 10 or 15 units of labor will produce when using conventional sand-cast ferrous metal parts. This is because the die-cast aluminum parts require a minimum of machine operations, and those that are necessary may be accomplished with light and speedy machinery.

Robechaud points out that such machine operations as drilling of holes prior to tapping, the machining of flange, boss and gasket surfaces, and milling of motor mating surfaces are entirely eliminated when aluminum die-cast parts are used. Tolerance limitations of the die-cast parts are narrow enough to permit tight or flush flts where required. In most cases,

aside from tapping, the only machine operation required subsequent to diecasting and prior to final assembly is deburring to remove flash metal and break down objectionable sharp edges.

Additional machine operations are eliminated by incorporating necessary steel parts, such as cylinder liners and various bushings, as metal inserts during the die-casting operation. A cylinder liner, for instance, is mounted directly in the die-casting machine and serves in effect as a part of the die during the casting operation. The same procedure is followed wherever steel bushing inserts are required.

The die-casting department includes two Cleveland die-casting machines and six Reed-Prentice machines—one a 3G model with a 15-pound capacity, and five 1½G models. Four Ajax electric induction furnaces are used to melt the aluminum ingots. The diecasting machines are complemented by a complete die-sinking department, tooled and manned to turn out whatever dies may be required, regardless of size or complexity.

There are many advantages in the use of electric induction furnaces for melting the high-silicon (11-13 per

cent) aluminum casting alloy. Automatic agitation induced by the high-intensity flux prevents silicon segregation, reduces porosity, and effectively eliminates hydrogen inclusion in the

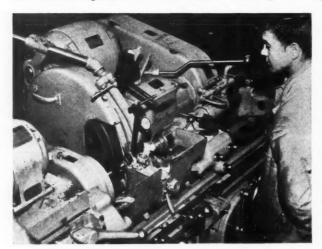


Fig. 2—Grinding the needle-bearing end of an engine crankshaft, using a Norton Cylindrical Grinder. In the finishgrind operation the dimensions are held to a tolerance of 0.0003 inch.

Fig. 3—Crankshafts are heated in this Thermonic Induction Heating Unit for 4½ seconds, then quenched, producing a case 0.050 inch deep and 60 to 62 Rockwell C in hardness. The induction heating unit is located in the production line.

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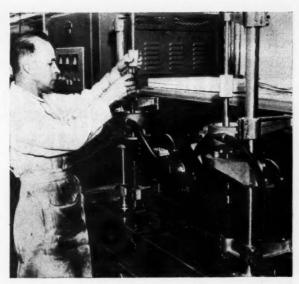
melt. The characteristics of the melt are such that no trouble is encountered during casting of the h-inch thin cylinder cooling fins.

An extremely low percentage of rejects is another advantage of the die-casting process. This advantage accrues not only from the die-

casting operation itself, wherein such common foundry defects as sand inclusions, blow holes, laps and excessive porosity are eliminated, but is further enhanced by the elimination of the many various machine operations necessary in finishing conventional sand-cast ferrous metal parts.

It is acknowledged that the initial cost of die-casting equipment exceeds by far the cost of comparable sand casting equipment, but Robechaud points out that these costs will be amortized by subsequent savings. Reduced personnel requirements, both as to number of employees and experience requirements, may be added to the machining and rejection savings already discussed.

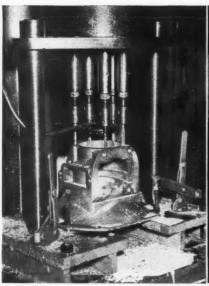
Insofar as dies are concerned, here again the cost of those used in diecasting greatly exceeds the cost of conventional sand molds and cores, but in heavy production runs, where a a great number of parts are required, the longer life of the former will offset this outlay. In die-casting work, a single die will run a minimum of



100,000 parts, and often upwards to 500,000 parts, before replacement is required. Sand molds and cores do well to last out a 10,000-part production run.

In designing dies for die-casting, Robechaud explains that much longer life can be obtained by incorporating metal inserts at the points where the molten metal will impinge during the casting process. These inserts, when worn by repeated impingement, are easily replaced at a comparatively low cost.

Despite concentration upon diecasting in their mass production plans, McCulloch engineers did not overlook those phases of manufacture necessary to produce non-aluminum engine components. The crankshaft line, for instance, is a complete production unit in itself, being laid out to receive rough forgings and to deliver completely machined, ground and hardened parts. The work of this department in no way overlaps with that of other production units. Eight Sundstrand and one Fay automatic lathe are used



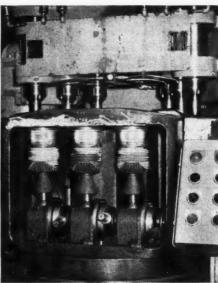


Fig. 4 (Left)—Cover plate holes in the crankcase are tapped with this Cleveland tapping machine, which is equipped with a five-spindle tapping fixture. Fig. 5 (Right)—Three cylinders are rough bored, three are finish bored, and three are replaced simultaneously in this Barnes six-spindle machine.

to turn the shafts, and 10 Norton grinders are required to finish grind the shafts after they have been hardened. The shafts are forged from SAE 1045 steel.

In the turning operation from 0.020 to 0.025 inch of stock is left on each shaft for the rough grinding operation, and 0.005 inch is left in the rough grinding operation for finishing. In the finishing operation, the main bearings are ground to within 0.0003 inch of the specified dimensions and all other diameters are ground to tolerances of 0.0005 inch.

The heat treating operation on the crankshaft is entirely automatic, with both heating time and quench controlled by pre-set timers. A Thermonic induction heating unit is set up in the crankshaft production line and the shafts are processed on their way from the turning to the grinding operations.

A conventional heating and quench ring is used, and the piece is not moved in the course of the operation. The shaft is heated in 41/2 seconds, then quenched, producing a case of approximately 0.050 inch in depth and a hardness varying between 60 and 62 Rockwell C. The quench is sprayed out of the ring at the correct instant and is reclaimed from the tray underneath the shaft.

Though available tooling is used wherever possible, in the majority of cases it has been modified for single-purpose operation. Drills are equipped with heads with which a crankcase can be tapped complete in a single operation; reaming and boring machines have been installed, each to perform a single task.

In the illustration Fig. 4 a Cleveland Type D tapping machine is shown fitted with a five-spindle Stanex-

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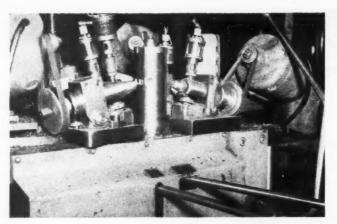


Fig.6—Milling square ports in a cylinder liner. The machine is semi-automatic.

Campbell multiple tapping fixture which is used to tap cover plate holes in the crankcase. The drilling operation is eliminated by having the holes cast into the piece in the die casting operation. The piece is located by means of locating pins, and clamped with the aid of De-Staco hand-operated clamps. To each clamp is fitted an adjustable pressure foot, held in place by two locknuts on either side of a welded bushing. When the piece is centered on the locating pins and clamped, the holes are in line for tapping. The depth to which the taps feed down is controlled by an automatic leadscrew, equipped with stops and an automatic reversing mechanism.

The Barnes six-spindle vertical machine shown in Fig. 5 has been modified to rough bore and finish bore three cylinders simultaneously, while three additional fixtures are being unloaded and reloaded. Each cylinder is located against the under side of the bushing plate in the top of the fixture, and is held in position by a hand-operated plunger at the bottom. The plunger is also a pilot for the boring tool. Both roughing and finishing tools are single-blade Carboloy cutters.

In the roughing operation 0.020 inch of stock is removed from the bore of

each cylinder and 0.009 inch is removed in the finish boring operation, leaving 0.001 inch of stock for honing. The honing operation is

performed with a vertical honing machine of standard design.

Special equipment includes a company-developed machine of unique design with which the square ports are milled in the cylinder liners. As shown in Fig. 6, the liner is mounted on a cylindrical fixture which can be fed vertically or revolved, both movements being actuated by hydraulic units. The cutters are two end mills, each carried in a spindle in a unit that is mounted on a slide which feeds horizontally.

At the start of the operation, the slides carrying the end mills move toward the workpiece until the end mills have drilled through the walls of the liner. The operator then bears down on the left-hand lever at the front of the machine, which causes the fixture, carrying the liner, to move downward until a vertical slot of the required length has been milled.

At this point the operator releases the left-hand lever and moves the right-hand lever to the left, applying power to a second hydraulic mechanism which rotates the liner to a given point. Pressure on the left-hand lever now causes the fixture to rise, carrying the sleeve, and pressure on the right-hand lever causes the liner to



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June, 1947

MODERN MACHINE SHOP

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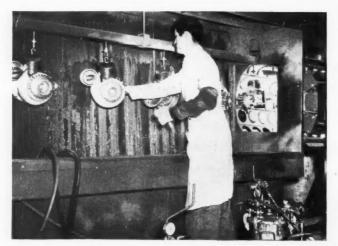


Fig. 7 — Spray paint booth. The operator is shown masking a part prior to spraying the cylinder. Before entering the spray booth, the cylinders pass through a tunnel of infra-red lamps, shown at the right, to heat them so that the paint will dry quickly.

rotate for the final cut. Thus a square piece is cut out of the wall of the liner, leaving a square port. The tolerance on this operation is controlled by the size of the end mill. When the mill is worn to 0.005 inch under-size, it is replaced. With the operation complete, the slides carrying the end-mills return to their starting stations.

Upon completion of the engine assembly, the engine is hung on a conveyor which moves it through a spray booth where it receives a coat of paint. Just before entering the paint spray booth, however, the engines pass through a tunnel formed by a bank of infra-red lamps which heat the engines sufficiently to speed up the paint-drying process.

The infra-red bank is 10 feet long and contains approximately 200 lamps, arranged in the form of a cylinder. As the engines move slowly through the tunnel they are heated evenly to a temperature of approximately 125 degrees F.; thus when the paint is applied it dries rapidly. By the time the engines reach the test room the paint is dry and the engines can be handled without delay. From the test room the engines travel by conveyor through a

final paint touchup room and thence to final inspection.

Current schedules call for 4600

engines a month. Although the basic design is identical, the operating parts may vary somewhat, depending upon the service for which the engine is intended. Some of the engines are used for fixed small power installations; others are used to drive wood saws, pumps, power scooters, and so on. Most of the parts are interchangeable, and others require only slight modifications in tooling to meet specifications. When and if a completely new design becomes necessary, retooling costs will largely be confined to the production of new die casting dies.

Benchmaster Machine Tools. An eightpage bulletin issued by the Benchmaster Manufacturing Co., 2952 W. Pico Blvd., Los Angeles 6, Calif., illustrates and describes time-saving bench tools for both industrial and home shop use, including inclinable punch presses for stamping, crimping, marking, punching, riveting, and forming; milling machines which can be easily converted from vertical to horizontal millers; and bench machine accessories such as rotary tables, collets, and swivel vises. Copy free upon request.

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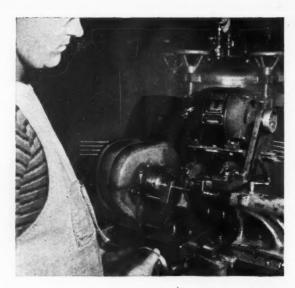
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Atlas lathe equipped with a special grinding attachment for grinding a cam on the end of a four-way valve part for a bombing plane. Here is a case where the tooling cost several times as much as the lathe.

By JOHN E. HYLER

#### Production With Light Machine Tools, II

Bench lathes and bench lathe tooling—Turrets, cross slides and stops—Types of collets and collet closers.

PROBABLY the most conclusive evidence as to the popularity of the modern precision bench lathe is the fact that this machine tool is made in so many types and models, by so many different manufacturers. Some of the lathes that properly come within the "bench-type" classification are of the highly-developed screw-cutting type. Some are equipped with automatic power longitudinal and cross feeds and with various types of mechanisms for ease of control. Others are of more simple design, but all are versatile as a lathe can be made.

The versatility that is characteristic

of the average precision bench lathe has in many cases been augmented, however, by the application of special features of design and even more by the development of different kinds and types of attachments for use with these lathes. A good example of the use of a special piece of equipment is found in the grinding attachment which, when rigged up on a lathe, can be used for a wide range of cylindrical grinding, including cam grinding.

Some of the bench lathe manufacturers provide milling attachments with which comparatively simple milling operations can be performed in the

#### Welded Steel Cuts Cost 27%

By C. D. Bonifield Vice-President in Charge of Production The Globe Company, Chicago, Ill.

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In our development program of continually improving the designs and production of our machinery for the meat packing industry, we have found it helpful to think in terms of arc welded steel construction. This affords a highly flexible approach to our problems and the end result is beneficial to



Fig. 1. Dry rendering cooker of welded construction.

the users of our products, the welded designs being strong, rigid, light-weight and of smooth, sanitary surfaces.

One design which has been changed recently to welded steel construction is the saddle for the dry rendering cooker shown in Fig. 1. Two of these saddles support the welded pressure vessel on the welded base of this machine.





Fig. 3 Welded steel saddle costs 27% less than former design.



Fig. 4. Fixture used for assembly of welded saddle

A saddle of former construction is shown in Fig. 2. The welded steel saddle, shown in Fig. 3, is produced at a total saving of 27% in cost over the former design.

The welded saddle, 60" wide, 24" high and 8" deep, is fabricated from ½" mild steel plate, consisting of four pieces, flame-cut and brake formed. The parts are assembled in the welded fixture shown in Fig. 4, which is placed on a work table in the flat position. After tack welding the parts together, the assembly is removed from the fixture and finish welded as shown in Fig. 5, with the saddle positioned for downhand welding of all joints. This requires continuous, two-pass fillets on both sides to join the flange to the web. The end pieces of the



Fig. 5. Joints are positioned for downhand welding.

flange are butt-welded on both sides to the top flange assembly.

In approaching designing problems, our engineers have been aided by the Studies in Machine Design published by Lincoln Electric. These can be secured by writing to The Lincoln Electric Company, Dept 303, Cleveland 1, Ohio.

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South Bend 9-inch lathe equipped with double tool cross slide, special tool box, die handle, and collet attachment for manufacturing special studs.

lathe. The usual milling attachment consists primarily of a work-holding fixture that can be anchored to the lathe bed by means of which the work can be fed to a milling cutter that is mounted on an arbor which fits into the lathe spindle. Some jobs require milling cuts to be angularly spaced in round or cylindrical work; in such

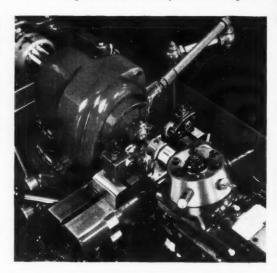
cases the design of the milling attachment includes a work-holding collet and means for indexing the collet as well as for traversing the work to the cutter.

However, all milling attachments for lathes are not made by lathe manufacturers. There is at least one firm—and possibly more — which builds special milling attach-

ments for bench lathes, but which does not build the lathes. The small job or tool shop that is handicapped by a shortage of machine tools, or which is "swamped" by too many milling jobs, can ease the strain by the use of a lathe milling fixture.

Productivity is quite distinct from versatility, although both qualifications may be found in the same machine tool and although both are relative terms. When the application of the various attachments for grinding, drilling and milling on the bench lathe is taken into consideration, the versatility of the machine becomes obvious. Productivity, however, depends more upon the ability to speed the various elements of an operation, by whatever means this objective may be accomplished; thus efforts toward improvement in design have been aimed in this direction.

To save time otherwise spent on gaging, stops have been developed for application to bench lathes which precisely limit the travel of the tools, thereby making it possible to take duplicate cuts on any number of pieces



Hardinge High Speed Precision Second-Operation Machine set up with circular form tool, circular cut-oft tool, acorn die, stock stop center drill and drill and tap for secondoperation production of aircraft instrument parts.

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Spindle Speed: 280 R.P.M.

Depth of Cut: 3/8"

Cutting Speed: 315 S.F.P.M.

Feed: .017"

Type of Tool: Cemented carbide Cutting Lubricant: 1 part Sunoco to 20 parts water

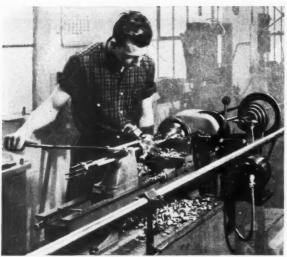
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INDUSTRIAL PRODUCTS



Atlas lathe equipped with collet chuck and lever-operated tailstock turret with six-station stop for first - operation production of parts from bar stock. The job shown is the manufacture of hose couplings from 11/16-inch hexagon bars. Operations: turn (with hollow mill), thread, center drill, drill, tap, form and cut off. The last two operations are performed with the carriage turret.

without the necessity of measuring or calipering in order to obtain the correct tool setting. One manufacturer of small lathes—Atlas Press Company—makes a carriage stop that can be clamped to the ways of the lathe to limit the travel of the carriage. This company also supplies a stop that can be clamped to the cross slide dovetail to limit the depth of cut. The use of such stops may save a high percentage of the time that would be required to do a job without them.

American Products Company makes a stop or limit gage for application to the bench lathe which can be used in any one of three ways. It can be used to limit the travel of the carriage when the carriage is being manually operated, and can also be employed as a semi-automatic device to stop the carriage at a point 3 inch from the end of the cut, allowing the carriage to be advanced by hand the last 3 inch. Again, it may be used as a fully-automatic device, stopping the carriage automatically at any pre-set point. It is impossible for chips or shavings to interfere with the operation of this

gage, and the gage itself does not interfere with the operation of other lathe accessories. It will not, for instance, interfere with the use of a taper turning attachment.

Where bench lathe machining operations are being performed on parts the overall length of which bears an important relationship to cuts required at one or both ends, special spindle stops are often used to advantage. While such stops are available for all sizes of lathes, a special model is made that is applicable to bench-type lathes. The stop is intended to be inserted into the hollow spindle of the machine, and can be anchored at any desired position in the spindle simply by turning a screw in the end of the stop. When a workpiece is placed in the chuck, it is inserted until the end of the piece strikes against the stop.

Of even greater significance, production-wise, is the multiple form of stop which has been applied in so many instances in recent years to make it possible to accurately gage the length of each of a number of cuts taken on a workpiece mounted either in a lathe chuck or between centers.

For this purpose a manufacturer of a 10-inch lathe provides a "multi-stop" which is designed to be mounted on the front way near the headstock. Incorporated in the construction of the



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multi-stop are six adjustable stop screws, thus providing an individual stop for each of six cuts. The six screws are individually numbered, to identify the operations with which they are connected.

By setting each stop screw to control the length of carriage travel for the cut to which it is assigned, as many as six sequential cuts can be taken with the assurance that each will be accurate as to length and with-



Forming a circular part from sheet metal by spinning in a 9-inch South Bend bench lathe. The high speed and flexibility of the machine make it especially adaptable for this work.

out the necessity of measuring or gaging.

Stops of the multiple type for limiting the longitudinal travel of the lathe carriage are available from others than the lathe manufacturers, however, and are usually designed so that they will fit the ways of most small lathes. It is not unusual to find them used in connection with the use of

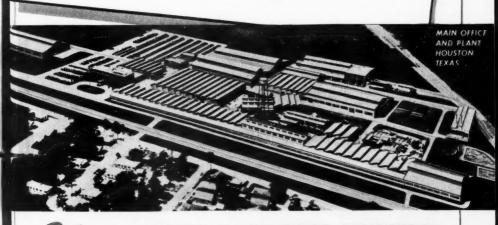
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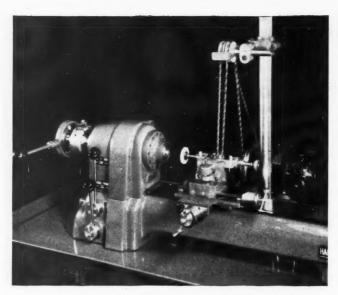
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Hardinge High Speed Precision Bench Lathe with ball-bearing lever collet closer and compound slide rest, and with adjustableheight grinder in place. A high speed motor drive unit for driving the grinder is mounted at the rear of the lathe. The adjustable-height grinder attachment is much used for both internal and external grinding of precision tools and tool parts.

toolpost turrets. This application will be discussed later in the article.

Multiple stops have also been designed for application to the bench lathe by which the cross slide can be set to turn a number of varying diameters accurately without the necessity of calipering the work for each cut. Considering that, where such a stop is not used, the time required for gaging and repeating cuts in order to obtain the required accuracy may amount to as much as 50 per cent of the total time for the job, the value of such a device may readily be imagined. Some

of these crossfeed stops are designed to control four diameters; others are made for use with jobs requiring

different diameters.

Although special cross slides designed to hold single tools are often used on small precision lathes, both at front and back, toolpost turrets have their advantages for use on production operations on light parts. As indicated above, multiple carriage stops may be used to great advantage in connection with turret toolposts. Some of these toolposts are particularly designed for use on 8-inch and 10-inch South Bend lathes; others for Sheldon, Atlas, Logan, and similar bench lathes. These turrets are designed so that each

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He tells me they haven't had to clean the unloading valve since putting in the North Star Oil."

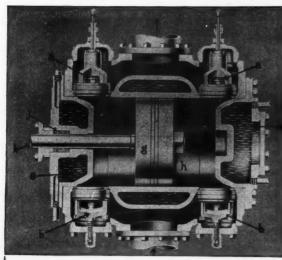
Solving compressor operating problems has been our forte for years. A phone call or card to the Cities Service office nearest you will bring this engineering experience to your plant. There is no obligation. Write for our free booklet, "Air Compressor Lubrication." Cities Service Oil Co., Sixty Wall Tower, New York 5, N. Y., Room 115.

\*Names on request

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a-Discharge valves • b-Intake valves • e-Water jacketed cylinder heads • g-Piston • h-Cylinder wall • j-Stuffing box • k-Piston rod

holds four tools, one on each side.

For operations of the screw machine type, such as drilling, threading, tapping, box-tool turning, and similar operations, a tailstock turret can be used to good advantage. Such turrets are available from a number of manufacturers. The tailstock turret is usually designed for six tools and, unlike the toolpost type of turret, must be designed to incorporate its own stops.

A good example of this type of accessory is the tailstock turret made by Atlas Press Company. The turret includes the indexing head and an extra long feed ram with hand-lever control and depth stop screws mounted in a special turret tailstock. The semi-automatic indexing head has six %-inch bored holes for tool holders. Moving the quick-acting hand-feed lever to the extreme right unlocks the turret head so that the next tool may be

positioned; advancing the feed lever locks the tool in position. Six adjustable stop screws at the end of the feed ram are automatically indexed with the head, and accurately gage the depth of cut or insertion for each tool.

Bed-type turrets are also available which may be installed by simply removing the tailstock from the machine, thus practically converting the lathe into a hand screw machine or small turret lathe. One make of bed-type turret is of six-station type, has automatic stops, and is self-indexing to position. Another and similar unit, equipped with a heavy six-inch turret head and designed for use on Logan, South Bend, Atlas and similar lathes, can be depended upon to handle small screw machine work very nicely.

Many jobs are handled on precision bench lathes, however, which do not require more than one end-working tool. A single tool can be held directly

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-with ¼" shanks; 16 standard shapes;
3 cuts (Coarse, Medium, Fine); ½" to 1½"
stock diameters.

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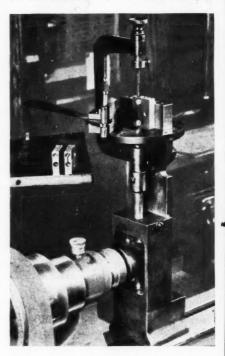
Large Capacity: Full 10" from Table to Bottom of 7" Wheel.

Precision Spindle. Large Bronze and Precision Ball Bearings.

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in the tailstock. For such jobs, however, it is important that fast tool action be provided and from this necessity sprang the idea of a lever-operated tailstock.

One leading manufacturer of small lathes supplies a lever-type tailstock for use with his 10-inch machine. This



Filing attachment mounted on a Stark bench lathe to perform a slotting operation at the Sperry Gyroscope plant. The filing attachment is driven by an eccentric collet mounted in the lathe headstock.

accessory does much to speed up any single operation from the tailstock, such as drilling, reaming, tapping, countersinking, and so on, or when using the tailstock as a stop for bar stock. Quick-action levers for tailstocks are made by several manufacturers who do not make lathes.

All of the accessories noted above



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Providing a positive and measured index of squareness error, this T-P Comparator Square also saves wear and tear on surface plates—and on personnel, too, since there's no more need to wrestle heavy pieces into position for sighting.

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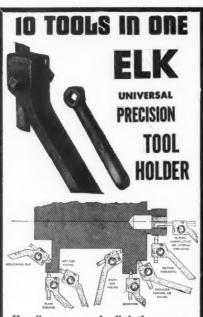
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Handles any and all lathe operations. Also for planer and shaper and special equipment. Easily and quickly switched from one operation to another, often without removing tool holder from tool post. See the various set-ups that can be made with one Elk Tool Holder.

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make for much faster tool action than could otherwise be realized on small lathes. The natural team-mate to such equipment consists in means for quickly setting the work itself, ready for operation. Here, again, the lever principle is utilized, as a means of closing lathe collets and releasing them for machin in g small-diameter work. Lever-type collet chuck closers are not recommended for work where extreme accuracy is demanded, but they are sufficiently accurate for the bulk of the work that is handled in these machines.

As provided by some bench lathe manufacturers, the lever-type collet chuck closer will permit stock 1/32 to ½ inch diameter to be chucked and released with the lathe running. Where extreme accuracy is demanded, a special draw-in collet chuck attachment will usually meet requirements. However, a certain amount of time is lost in the operation of some of these attachments, as against the lever-type device, because the lathe must be stopped to open and close the collet.

One make of lever-type collet closer has been observed with which any size of stock from & to ½ inch can be fed through the spindle. In addition, step collets can be made to accommodate larger diameters when the machine involved is being used for second-operation work only. The gripping action of



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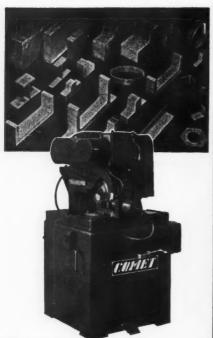
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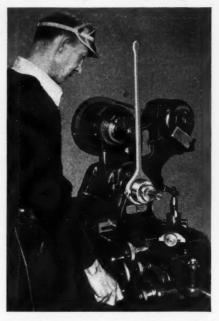
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AUTOMATIC CUT-OFF MACHINE

this type of collet closer on the stock is adjustable to any desired tension, without loss of time, and the collet closer is easily attached to a Logan, South Bend, or Atlas bench lathe designed with a No. 3 Morse taper in the headstock spindle.

An attachment of somewhat similar



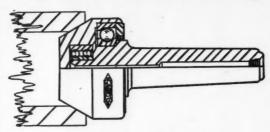
Hall 1-inch collet chuck mounted on a light lathe. By means of compound leverages, the chuck is enabled to exert the gripping action of a full bar stock grip with only 1/16-inch grip. The collet automatically adjusts to variations in stock size of 0.007 inch over or under size.

design, often used in connection with a special lever-operated cross slide for forming and fast cutting off, is made for application to Atlas, Craftsman, South Bend, and similar lathes of %-inch spindle capacity. Still another, usually referred to as an automatic drawbar, is adapted for use on the Atlas, Logan and South Bend lathe. This one has a good differential range



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between open and closed positions, and can be mounted on any of these machines in about three minutes.

One of the newer pieces of equipment in this line is a push-out type of collet chuck that is operated by means of a lever which projects practically straight upward from the collet. This device, product of Hall Manufacturing Company, provides full spindle capacity and automatically adjusts itself to variations in stock sizes. The collet is locked or unlocked by a mere slap of the hand while the lathe is running; thus the use of this piece of equipment makes it possible to obtain precision work on a production basis.

With only 10 inch grip, the Hall collet chuck has virtually the same rigidity, grip and accuracy that is normally expected of a chuck with a full bar stock grip. This powerful grip is built up through the application of compound leverages, completely elim-

inating the need for latches, cams, dogs, and so on. The chuck is made to fit any lathe.

Michigan Gear Lappers and Gear Speeders. Two revised four-page descriptive bulletins—No. 995 covering its crossed axis production gear lapping machines and No. 1127 covering its "Sine-Line" gear speeders—have been issued by the Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. The bulletins contain illustrations, complete specifications, and descriptions of the machines and their operation. Copies free upon request.

"KleenKut," a laboratory controlled water-mix cutting oil, is described in a four-page pocket-size folder published by the D. A. Stuart Oil Co., Ltd., 2741½ S. Troy St., Chicago 23, Ill. The folder discusses typical applications of the cutting oil and the proper method for mixing with water. Copy free upon request.

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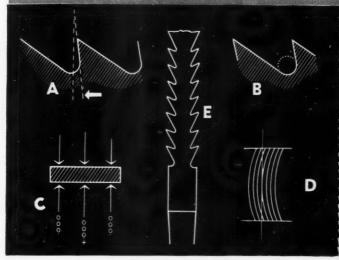
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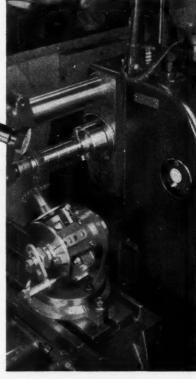
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Ellis Dividing Heads are precision production tools that will add versatility to many of your standard machines. Their exceptional design includes the useful 40:1 ratio with crank indexing plus an auxiliary swiveling base and a direct indexing attachment. These make possible up to 400 divisions and allow swiveling through  $360^\circ$  in the horizontal plane and tilting over  $100^\circ$  in the vertical plane. Two riser blocks increase the normal  $6\frac{1}{2}$  swing to 11". Provision is made to hold work in chucks or collets, and a tailstock can be supplied for holding work between centers.

The illustration above shows a typical application where an Ellis widens the scope and increases the productivity of a hand miller — it will do the same for your machines and make your tool room more profitable. Write today for complete details.



## Making Hand-Wrought Copper Products

No better exemplification of the American spirit of free enterprise could be found than this small manufacturing business in Seattle.

By M. G. HAWKINS

THE members of the organization of Empire Copper Works, Seattle, Washington, make no claims that their plant should be included among the high-production plants for which American industry is famous, but they do point with pride to the fact that their company and its business comprise a perfect example of the

spirit of American free enterprise.

Here is a typical small business, operated by men who take pride in their business and in their product, who are putting every ounce of effort, individually, into making their business succeed and grow. Not all of the machines and tools are of the latest type; primitive methods compete with

mechanized equipment in this shop, but the cooperative spirit of the members of the organization offsets to a large degree the lack of modern tools.

The company makes hand wrought copper and brass products, and has been able to build up a business which, in volume, is one of the largest in this



Cutting copper discs from blanks for forming into hand - hammered copper bowls and similar consumer goods. Spinning a copper bowl. With the lathe running at high speed, the operator uses a round-nose forming tool to shape the plece to the contour of the wood chuck.

line in the Northwest. The line of products includes cocktail tables, candelabra, trays of various kinds and sizes, bowls, cups, plates, and brass and copper novelties of all sizes and types.

Most of the forming is accomplished by "spinning," which is done in a lathe designed especially for this operation. However, before a piece can be formed to shape it must first be cut, in the form of a square, from a sheet of 24 gauge hot rolled copper. The square is called a

blank, and the size of the blank depends upon the depth and diameter of

the finished piece.

Using a hand-operated circle shear, the blank is cut to the form of a disc which is then put into the spinning lathe to be formed to shape. In the lathe the disc is firmly clamped between the chuck and a pusher block attached to the end of the tailstock spindle. The block is attached to a shaft which is a running fit in the spindle, so that the block can revolve with the work.

Inasmuch as practically all metal spinning is done on the outside of the workpiece, the chucks used in metal spinning are of convex shape and of the form specified for the finished piece. Both the chuck and the pusher block are of Eastern hard maple. Although considered "hard," as the term applies to wood, the maple is just soft enough so that it resists the tendency



to slip under pressure of the spinning tool; thus wood is superior for this purpose.

With the work-piece in position and the lathe running, the piece is formed or "spun" by the use of a special tool which is made of tool steel and is shaped something like a soldering iron with the point flattened and rounded. The tool is never made with a point or sharp edge because it would cut the metal. The tool is mounted on a hard maple handle approximately three feet long and shaped something like a baseball bat, the large end carrying the tool and the smaller end being used to guide the tool.

To use the spinning tool correctly, the handle is held under the operator's right arm so that the arm can hold it tightly against the body, with the working end of the tool braced against the pin in the toolrest of the lathe. It will be noted that the toolrest is wide



After shaping, the copper bowls and plates are hammered by hand to produce the attractive "handhammered" appearance.

and contains a number of holes for the pin, so that the pin can be adjusted as the operation proceeds. The spinner holds the tool handle with his right hand and holds the tool against the pin with his left, both to steady it and to be able to change the pin quickly from one hole to the next.

In the spinning operation the operator seems to be bending the metal to the shape required, but actually this is not so. The tool actually stretches and draws the metal to the contour of the chuck, which is exactly the same action that takes place when a sheet of metal is drawn in a die.

To assist in the forming or "spinning" operation, the metal disc is lubricated by the simple process of holding a cake of Fels naphtha soap against it as it revolves. Fels naphtha laundry soap is preferred by many workers for this purpose, due to the fact that it neither flakes nor leaves the metal dry.

Occasionally a workpiece requires flutes or other special features which necessitate more than an average amount of working, in the course of which the copper becomes workhardened. When this occurs, the piece is annealed by placing it in a small furnace and heating it to red heat (approximately 600 deg. F.), after which

it is immediately plunged into cold water. This treatment restores the copper to its former temper and plasticity.

When an article is required to be fluted or shaped beyond the body of the chuck, a backstick is held in the left hand and is pushed against the inside of the spinning work in opposition to the tool or "spoon." This ability to form a radius or flute "in the air" is developed through years of experience at the spinning lathe. Great care and long experience are necessary to be able to produce perfect work, without forming wrinkles.

When the piece has been spun to the shape required, it is removed from the lathe and washed to remove the soap, then the rough edges are filed to remove all burrs. Finally, it is again annealed and washed in a bath of sulphuric acid.

This done, any desired design is imprinted on the bowl with transfer or carbon paper, then formed in the metal by hammering with a peen hammer which has a ball-shaped head and a pointed foot about five inches

158



# THIN Wall

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As the production of Sleeve Bearings from BRONZE-ON-STEEL is essentially a series of stamping operations there is a low unit cost. This is particularly true of long runs. Why not investigate the possibilities of BRONZE-ON-STEEL now? Your inquiry carries no obligation. Excellent delivery of your requirements is now possible.

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Write for new folder which describes BRONZE-ON-STEEL in detail. It's FREE.





BRONZE HEADQUARTERS NEW CASTLE, PA. (Right) Spraying a finished bowl with lacquer. Note the revolving table made from a bicycle wheel. (Below) Buffing copper plates in preparation for coating with lacquer.



long. The hammers used for this work vary in size and type, according to the necessities of the designs. After hammering, the workpieces are again annealed and immersed in an acid bath.

With the workpiece spun to shape, embossed and trimmed, it is ready for the buffing operation. The buffer uses two grades of jeweler's rouge; a coarse grain to produce a satin finish on the outside of the piece and a fine grain for a high degree of finish on the interior. The bottom is given a light buff.

The bowl is now ready for the application of the lacquer finish, which is sprayed on with the usual spraygun equipment. In order to expedite this operation and to make sure that the piece is well covered, a revolving work-table is made from a bicycle wheel, mounted horizontally. With the workpiece in position on the wheel, the wheel is slowly revolved while the spray gun operator sprays an even coat of lacquer around the inside of the bowl. Then the bowl is turned upside down on the wheel and a coat of lacquer is sprayed on the outer surface and bottom. When finished, the piece is placed on a wire rack to dry over-night.

The spray table is placed against a wall which has an opening cut in it at the level of the work bench and in which an electric suction fan is mounted to remove the lacquer fumes during the spraying operation. Ideal drying racks can be made from wire bunk beds of the type used in ships. Galvanized iron washtubs make excellent immersion tanks for the chemical baths used to remove oxidation from gas-torch annealed copper.

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### It Takes More than Red and Green to Make a Safe Plant

By JAMES A. MEACHAM

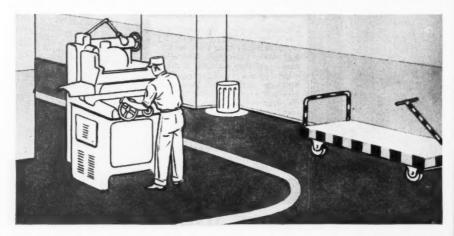
The Sherwin-Williams Co.

A LERT industrialists are now burning the midnight oils planning new and better ways to keep costs down, production up, and books balanced. In this crazy heyday of rising prices and rising costs, every factor which will improve the productivity of the individual worker is now being given careful consideration. As a part of this program an increasingly large number of plant owners and managers are investigating the ways color can be of service to them.

It is generally known that color in itself when properly used can convey

a message, such as "stop," "don't touch," "danger ahead" and many other warnings. But color has a far greater safety value than these apparent warning signals when used properly in a plant.

For example, the mere painting of a plant in an approved pattern of colors that are harmonious, such as any one of the 17 recommended by The Sherwin-Williams Company, may in itself materially reduce the chance for accidents. These color harmonies, scientifically selected are not only restful to the eyes but stimulate alertness



Zone marking bands on the floor in yellow or white are a warning to keep them clear. White under waste basket improves housekeeping and orderliness. Yellow and black stripes on lift truck prevents accidents.

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## ousselle UNCH PRESSES 5 & 10 TON CAPACITY BENCH PRESSES

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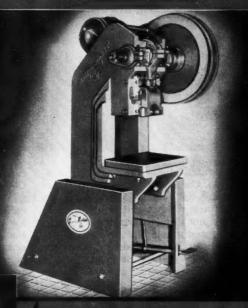


These Press-es were de-signed to provide

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These models will handle. any requirements within their capacities for stemp-ing, blanking, forming and



15 TON HORN PRESS

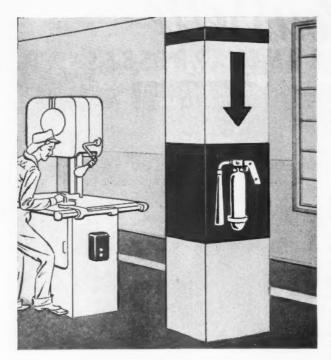
This Press is performing a wider variety of jobs which until recently were not thought of as Press operation

The predominant feature is the adjustable bed which can be raised or lowered to

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Fire equipment can be identified with a red band around the column and an arrow vertically pointing down to the equipment. The arrow should be visible from all points in the room over the top of the machines. Red on the control box'on the machine indicates where it can be stopped in case of emergency.

and watchfulness among the employees. Case histories prove they are a factor in keeping plant efficiency high during those critical hours just before lunch and late in the afternoon when production has a tendency to slump and when accidents caused by carelessness tend to increase.

Maximum efficiency, worker morale and safety is usually achieved when the plant is carefully painted to please the employees and to make every hazard easily visible. We have found from experience that color harmony must be selected to be in harmony with the employees' tastes, rather than from broad general classifications of what constitutes good color planning. The range of acceptable colors from a standpoint of visibility and light reflection is broad enough to make possible color selection which fits into the

accepted tastes of most employees.

For example, men in heavy industry will almost unamimously choose browns, blues and greens as the dominant color. However, in light manufacturing plants where women are employed, the trend is to the more deli-

cate shades like turquoise and peach. Color must also be consistent with the general atmosphere of the plant. Cool colors are preferred where the interior of the factory is above normal temperature and where sunlight is excessive. Warm colors give better results in poorly lighted areas and departments which receive their light primarily from the north.

But the problem of selecting color does not end there. Into the color harmony chosen must be blended the "warning signals" which are so essential to safety. It is on this point where many color engineers have widely divergent views. One recommended color warning system calls for using red on fire protection equipment only. This includes fire hose, fire extinguishers, alarm stations and hydrants. The other danger spots in the



## MONDAY MORNING ODUK getting your Operators down?

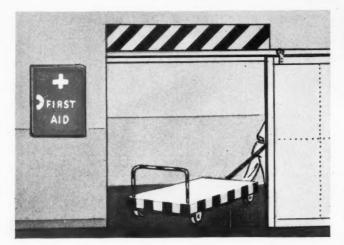
SWITCH to Cimcool, and you and your workers can breathe freely. For this revolutionary new kind of cutting fluid helps keep air clean in three definite ways: 1. Cimcool is a chemical emulsion, and therefore is not subject to rancidity even in the hottest weather. 2. Cimcool can't burn or smoke. 3. Cimcool produces no objectionable odors. No wonder that wherever it's used, operators swear by it.

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- No fire hazard—No slippery
- No chromates or other skin with
- Contains long-lasting rust imbit
- Chemical lubricity increases to life.
- Covers 85% of all metal warping jobs.

CIACO A MULTI-PURPOSE CUTTING FLUID

CIMEDOL DIVISION of THE CIMERNATI MILLING MACRINE CO., CIMERNATI 6, PRIC, M. S. A.



All color engineers agree that green is the only color which should be used to identify safety and first aid equipment. The yellow and black stripes on the door indicate an overhead obstruction, and the same 'stripes on the truck indicate a hazard.

manufacturing plant are painted either yellow or orange.

Yellow, the most visible color in the spectrum, is used to mark trucking equipment, conveyors, aisles at hazard points, platform edges and pits, railings, protruding parts, curbings, floor level changes, and chain hoist blocks. Orange, another highly visible and advancing color, is used to mark parts of machines or equipment that might cut, crush or electrocute, interior surfaces of fuse and power boxes, machinery guards, pulleys, gears, cutting machinery and electric switches of all types.

The American Standards Association code, recently adopted, expands the use of red to include danger points, emergency buttons and bars for stopping machinery. Yellow is used as a caution signal and to mark hazards which workmen might strike against or stumble over, such as columns, platform edges, crane hooks, and so on. Orange is an optional color in this code for hazardous marking.

All color engineers agree that green should be used to identify safety equipment, such as, first aid equipment, dispensaries, medicine cabinets, respirators, stretchers and surgical wagons.

One of the great problems of the

color engineer has been to fit all of these warning and safety colors into a color harmony scheme in such a way that they convey their message easily and immediately and still fit into the overall pleasant color harmony. For years, ceiling pipes in many plants were painted red. This gave an overhanging striped effect which distracted the employee's attention. Many engineers say the red served no useful purpose and now they are recommending that the pipes be painted the same color as the ceiling. Only the sprinkler heads, they feel, should be painted red.

In keeping with this plan for maximum efficiency of both the color harmony and warning signals, Sherwin-Williams engineers believe that strong colors, such as red, should be restricted to places that are extremely hazardous, lest the significance of the danger signal be lost through use at too many places which are only mildly hazardous. They would rather see three red signals in a department than three hundred.

From discussions with superintendents and management of a great many plants, our engineers conclude



that the following are practical uses of color for safety:

1. Identification of fire extinguisher locations by a red band around the column on which the extinguisher hangs and possibly a red arrow vertically on the column with the point down, the arrow being in a position where it is visible from all points in the room over the tops of the machines.

2. Red against a white background at the first floor location of the sprinkler riser valve which shuts off sprinkler water to prevent further damage after the fire is out.

3. We find it generally agreed that the common practice of identifying sprinkler piping on the ceiling with red does not serve a useful function. Piping should be same color as ceiling.

4. Zone marking bands on the floor in yellow or white to identify trucking aisles are very practical. Such bands assist in keeping the aisles free and operators of moving equipment, like motorists on the highway, are strongly influenced to keep within the prescribed bounds.

5. Red used on electrical starting buttons and switch boxes on machines calls attention to the point at which the machinery can be stopped in case

of emergency.

6. Attention may be directed to points of extreme hazard by painting them with red or orange, bearing in mind the thought brought out previously that if too many points are identified with the danger color, much of the significance is lost. Furthermore, in our opinion, where extreme hazard is involved the area should be protected by guards rather than by reliance on color schemes.

In conclusion allow us to point out that color has a dual safety job to perform for industry. First and foremost, it must be so used that it conveys a message to employees. To do this color



Saves time! Saves back-breaking labor! Increases accuracy! Cranks retract locating pins and tilt bolster and head so finishing work can be performed on either member of die. An accurate check on corrections is then possible since die returns to its original position.

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must induce a subconscious response on the part of the workman.

Second, color, in the hands of one who understands color-psychology and its possibilities, becomes a tool that can be used effectively in the overall safety of the plant. Alert employees, living in a bright and refreshing environment of pleasant color harmonies are not apt to become careless. Moreover, the pleasant surroundings will tend to make employees want to keep

their work-place clean and neat, thereby eliminating the accidents which go hand in hand with dirty, disorderly surroundings. Workmen who enjoy their surroundings more readily keep their minds on their jobs and the task at hand. Well lighted plants reduce the hazard of falling over or bumping against objects. All of these are important safety factors, and all help to increase production and raise worker morale.

#### U.S. Steel Measures Hardness of Steel Grains

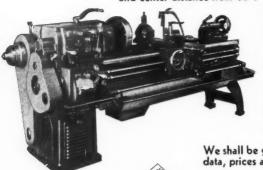
The hardness, not only of a piece of steel you may feel in your hand and examine with your naked eye, but of microscopic grains within the steel, can be measured by a new device designed by the research engineers of United States Steel Corporation of Delaware. Still more minutely, the

new microhardness tester can gage the hardness of a single steel grain at as many as three points within the breadth of a human hair.

By no means an instrument of abstract research alone, this tester is in continuous use at the Kearny, N. J., laboratory, where it is aiding in per-

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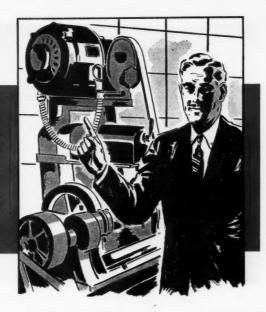
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172 MODERN MACHINE SHOP

June, 1947

# IT COMES RIGHT DOWN TO This



#### "YOU'LL SAVE MONEY BY MOTORIZING"



For new machines, or old. Gear case cover is removed in this illustration to show internal construction. Hinged rest plate maintains belt tension. One to  $7\frac{1}{2}$ -h.p., with or without supporting bracket.

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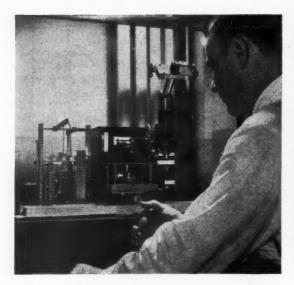
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U. S. Steel's Kearny Tester indents the surface of the steel sample to a depth of 2 microns. Three such indentations can be made within the breadth of a human hair.

of a very few grams leaves a square mark which can rarely be seen by the naked eye. The diagonals of this tiny square identation are measured in microns, or thousandths of a millimeter, and this reading related to the load placed on the penetrator so that the hardness may correctly be computed.

Preparation of the sample of steel whose hardness is to be measured re-

quires elaborate care. A small sample, which may be mounted in plastic, is ground and finished with polishing paper, care being exercised so the grinding effect does not extend below the surface. Then it is polished on wet lead laps. Alternately the sample is polished to a mirror finish with a soft abrasive so finely divided that when shaken in water it will take a half hour to settle, and lightly etched with acid to bring out the grain boundaries. This dual process is continued until no disturbed metal is observed under the microscope.

fecting studies of the microscopic constituents of steel. The results of these studies are coordinated to develop steels of definite hardness and toughness for specific applications in the home and factory, on railroads, ships and planes, and in the American family's automobile.

Like the Brinell, Rockwell, Vickers and other traditional hardness testers, but on a much finer scale, the Kearny device operates by indenting the polished surface of a steel sample. Its diamond-point penetrator under a load



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operator, the POWERFUL, PERSISTENT PULL for which they are noted. These one-arm Toggles require no lubrication, have long life and seldom need replacement, even under constant in-and-out engagement. Another money-saving feature of value to you is the RING-OILING SYSTEM used on the Loose Pulleys of these clutches. This is proportioned to the speed: needs filling but once in 30 to 90 days and protects you against ground-out Pulleys, scored Shafting and expensive shut downs. Over 25,000 MULE-PULL CLUTCHES are in daily use.



The operator of the microhardness tester then places the sample under the microscope on a movable bed plate and selects the grain or area to be tested. When this is determined the sample is transferred to the penetrator mechanism. The penetrator arm, balanced with its adjustable weight suspended on knife edges, slowly bears down to make the indentation.

After the indentation has been made the sample is moved back under the microscope and examined. Depending on the hardness of the sample, indentations may range upward of 2 microns in depth, which is proportional to the diagonal of the square indentation. This is measured in microns. (One micron equals roughly forty millionths of an inch.) The device makes possible the measurement of hardness gradients within areas too small to permit satisfactory exploration with any of the usual hardness testers.

The microhardness tester measures with amazing accuracy the hardness of the hardest steel constituents. which is necessary in order to know the degree of hardness of steel grains themselves, and of the iron and other alloy carbides. The mechanism consists of the indenter with a squarebase, 136-degree diamond pyramid penetrator, the mechanical stage for holding a specimen, a microscope capable of magnifying the test field 500 to 1500 times, and a control box. All parts are assembled on a heavy castiron plate supported by steel legs which rest on insulated wooden blocks to minimize effects of vibrations present in the building. As many as 60 indentations may be made automatically at predetermined time intervals for surveying tiny gradients, which may have an important influence on the behavior of a fabricated product such as a weld.

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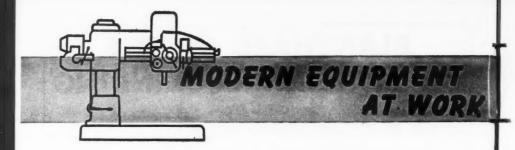
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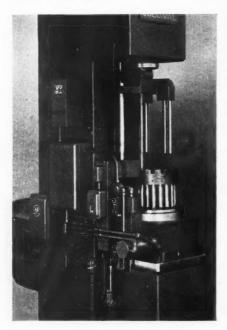
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#### ID of 720 Steel Tubes Per Hour Finished on One Utility Press

A UTOMATIC finish sizing and surface conditioning of the I.D. of steel tube shock absorber housings can be performed at a rate of 720 tubes an hour on a single machine. The operation consists of pushing hardened steel balls through the tubes to finish them to 1 inch ID.



For this purpose, the company employs a Colonial "Utility" hydraulic press equipped with automatic indexing fixture. An automatic loading and feed mechanism for the balls was also built into the machine by Colonial Broach Company, Detroit 13, Michigan.

The installation operates on a continuous cycle. Even unloading of the work is automatic. The operator merely drops the tubes—two at a time—into the indexing fixture at the loading station. As will be noted from Figure 1, the ram of the press is fitted with a head having four push rods. The two toward the column of the machine are for pushing the balls through the tubes (two tubes at a time). The two rods at the right of the machine are for ejecting the finished tubes from the fixture. The automatic ball feed mechanism is at the left.

Fig. 2 shows a close-up of the fixture with the ball chutes in the background. As the fixture indexes two tubes in front of these chutes, triggers release two balls which roll into position on top of the open end tubes. In the next machine station, the balls are pushed through. The balls then drop

This special Colonial Utility hydraulic press is used to automatically ball size some 720 steel shock absorber housing tubes per hour. Cycle is continuous. Operator merely loads the fixture; even ejection is automatic.



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Above: this rugged, one-piece frame casting is the "back-bone" of an International Tractor.

> Profitable Facts For Tap Users

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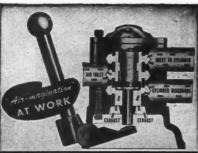
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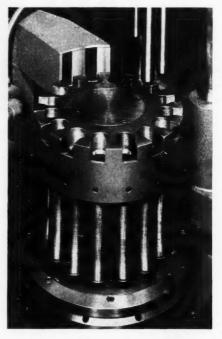
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Lehigh-MARTON AIR-CONTROL EQUIPMENT

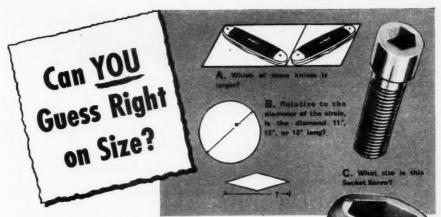
into a lower hopper and are raised into the upper hopper by the hydraulically operated feed mechanism—which is interlocked with the machine cycle. More than two balls are used in the machine of course, the design of the feed mechanism being such that



Close-up of the fixture and ball feed mechanism. A ball rolls out of each one of the two chutes in the background—into position on top of the tube—each time the fixture indexes. Balls are automatically returned to the chutes. The two rods in the foreground eject the tubes through the side of the base.

the raising of two balls positions two other balls in the chutes ready for release by the trigger mechanism.

When the finished tubes reach the station at the extreme right of the machine, the two rods in the foreground of Fig. 2 push the tubes down and out of the fixture, the tubes dropping out through an opening in the side of the machine base.



GUESSING is fun in a game . . . but there's no place for it in shop practice. Wrong guesses cost money . . . and they happen more often than you think. For example, the size and thread pitch of the socket screw above was guessed wrong by many veteran shop men questioned in a recent test. On the job . . . such mistakes waste time.

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Operation of the machine is hydraulic throughout, including the index and feed mechanisms. The design of the hydraulic mechanism follows the standard Colonial design practice as used on Colonial broaching machines. Indexing takes place near the top of the automatic return stroke, just before the ram starts down again. The machine has a rating of 6 tons with an 18 inch adjustable stroke.

#### Savings Shown With Ejector Type Tool

WHEN subjected to a severe production test, an ejector type tool recently introduced by Super Tool Company, Detroit, Michigan, disclosed a 600 per cent saving of tool cost over tools previously used. Two views of the tool are shown in Fig. 1, the lower

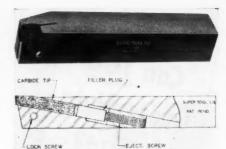


Fig. 1-Ejector Type Carbide Tipped Tool

view illustrating the construction of the tool.

The production test to which the ejector tool was submitted involved the machining of cast iron columns measuring 4 feet in length by 7 inches diameter with each column having a 1¼ inch slot along the side as shown in Fig. 2A. The diameter of the col-

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Oet This Useful Keyway Reference Manual

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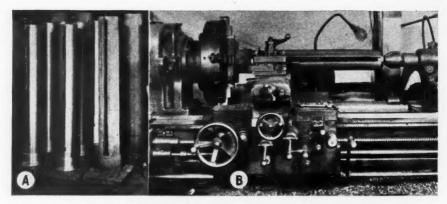


Fig. 2—(A) Cast Iron Columns Used In Test With Ejector Type Carbide Tipped Tools.
(B) Lathe Setup Showing Machining of Cast Iron Columns.

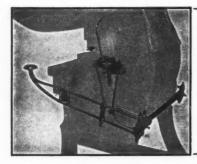
umns had to be machined to 6 inches diameter notwithstanding the interrupted cut and shock factor. The work was performed on a heavy duty, 20 h.p. lathe as shown in Fig. 2B. The feed per revolution was .051, with production per grind of 5 columns, using the ejector type tool.

The ejector type tool provides for secure holding of a solid, replacable bit without applying stresses. In resharpening, the carbide bit can be extended by simply turning a recessed ejector screw. With the carbide tip thus extended, it is unnecessary to grind or even bring the diamond wheel in contact with the steel holder.

#### Zagar Gearless Drillhead Excels in Drilling Gas Burners

THE accompanying illustration shows a standard Zagar Gearless 1500 Series Multiple Drillhead, designed to drill simultaneously 87 holes .080 inch in diameter on %-inch centers in a conventional hot water heating gas burner. It shows, not only the drillhead, but a complete drilling unit. Up to 100 burners can be drilled with this set-up per hour—a total of 8700 holes.

Drills are driven by a Vickers variable-drive motor. Speed of drills can



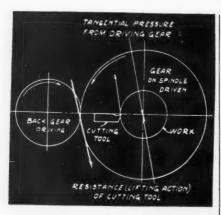
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The down pressure of the back gear at the front (see diagram) counteracts the upward lift of the tool, eliminating chatter inherent in lathes which have a double lift on the spindle — by the tool on one side and back gear on the opposite side.

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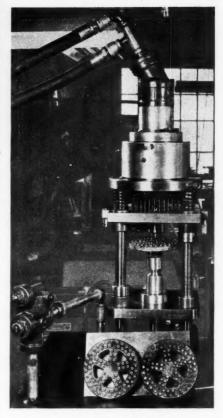
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CINCINNATI 15, OHIO, U. S. A.

be predetermined to revolve from 0 to 3000 r.p.m., as desired. This feature is important due to varied carbon contents of castings. Motor can be reversed at will.

Threaded drills are utilized. Two



Gearless Drillhead for Drilling 87 Holes Simultaneously

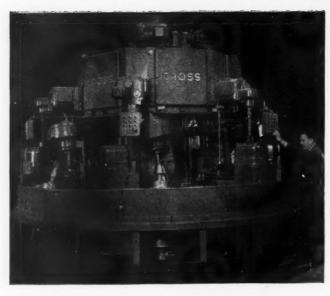
minutes time is sufficient for installation of drills or for removal, by dropping guide bushing plate and reversing spindles. Drills are securely held and cannot slip.

Work feed ram is hydraulically operated. Work is brought up to drill-

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Special Cross Machine Mills Taper Threads

The specially-designed machine shown in the accompanying illustration mills the taper threads on 19 different models of oil drilling cutters. Six self-contained, independent work stations are mounted on a circular bed

with variable rotary feed. The feed is timed so that each station automatically completes the milling on one piece of work during one revolution of the bed past the operator's station, All the operator has to do is unload and reload the pieces as the stations pass him. He then pushes a button to repeat the automatic cycle.

During the work cycle, the motordriven milling head quick-approaches to cutting position. With the cutter turning, the work head spindle spiralfeeds the piece upward into the cutter.

head at 30 feet per minute, when it comes in contact with depression valve, which slows feed to correct drilling feed and starts drillhead. When drilling is completed, a reversing valve returns ram to its starting point and stops drillhead simultaneously. Travel of work ram is from .0005 inch per revolution up to .010 inch per revolution.

The Zagar Gearless 1500 Series Multiple Drillhead is manufactured by Zagar Tool, Inc., 23880 Lakeland Blvd., Cleveland 17. Ohio.

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- SILVER STREAK, the heat-resistant abrasive that lets you speed up production safely.
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1741 Broadway . New York 19, N Y

Upon completion of the cut, the milling head moves back to idle position, and the work-head lowers while the spindle reverses. Production is from 20 to 40 oil drilling cutters an hour, depending on the thread length of the various models. This machine was designed and built by The Cross Company, Detroit 7, Michigan.

Barnes Constant-Flo Rotary Gear Pump is the subject of a catalog announced by the John S. Barnes Corp., 154 Walnut St., Rockford, Ill. The catalog fully illustrates and describes the design features of the pump, provides tabular information on standard sizes and specifications, and contains engineering data sheets on the various models in which the pump is available. Copy free.

Super Carbide-Tipped Standard Tools. A 36-page catalog published by the Super Tool Co., 21650 Hoover Rd., Detroit 13, Mich., contains illustrated, descriptive, and tabular information on a complete line of standard carbide-tipped cutting tools, including tool bits, ejector bits, threading tools, reamers, boring tools, centers, milling cutters, end mills, saws, counterbores, solid carbide drills, and tipped drills. In addition, the catalog presents tables of recommendations for cutting steel, machining ferrous castings and non-ferrous and non-metallic materials, milling cutter selection, feeds and speeds for carbide-tipped solid end mills, and so on. Copy of Catalog No. 47 free to mechanical executives upon request.

Bradford "Metalmaster" Electrical Tools are the subject of a 36-page catalog announced by The Bradford Machine Tool Co., 657 Evans St., Cincinnati 4, Ohio. The catalog depicts and describes ball bearing drills and accessories, heavy duty bench and pedestal grinders, carbide tool grinders, combination grinders and disc grinders, double end disc grinders, special purpose machines, heavy duty polishers and buffers, cutlery buffers and polishers, overhang buffers and polishers, combination grinders and buffers, flexible shaft equipment, attachments and accessories, and other items. Copy of Catalog No. 50 free to executives upon request.



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# TOOL OF

#### JACK OF ALL TRADES AND MASTER OF PLENTY

It's quick, it's deft, it's conveniently small, yet the Handee Tool packs a terrific wallop! Handee is the original, single hand controlled, electrically driven tool—and it's the finest today. It can be used at the bench or carried right to the job. It reaches hard-toget-at places on machinery, touches up perishable tools, grinds dies, chip break-

ers on broaches, removes burrs, etc. Runs at a cool 25,000 rpm. AC or DC. Wt. 12 oz.

Combined with its accessories and exclusive attachments, the Handee Tool performs more operations with greater accuracy than any other portable electric tool at any price.

#### PRECISION ATTACHMENTS

Fit Handee only. Offhand carving, routing, shaping is exact as to depth of cut, accuracy of line. Indispensable to pattern shop. Set of 6, postpaid, \$7.95.

HANDEE KIT

Strong, compact steel carrying case holds the Handee Tool and a complete assortment of accessories. Postpaid, \$27.50. Handee with 7 accessories only, \$20.50.

#### CHICAGO ACCESSORIES

Fit any power tool. The most complete line available. Over 500 — all finest quality. The right one for every job!

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RILLS, CUTS, SAWS, ROUTS,

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DELIVERY

CARVES, SANDS, ET

. ORDER NOW



#### An Emergency "Lathe"

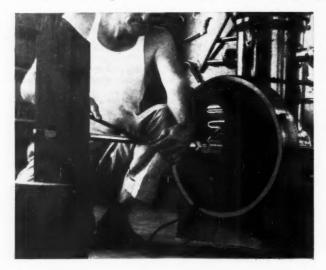
By ELTON STERRETT

WORN circulating water pump rods which had been kept around the plant, probably by a disciple of the belief that if one keeps junk for seven years he'll find some use for it, were reworked by means of an ingeniously devised "lathe" when a set of rods in service no longer could be used. The rods which had been saved were all badly worn where the packing, aided by sand carried in the water, had cut deep scores in the metal

and left sharp shoulders at either end of the gland travel.

Faced by the possibility of drawfiling the best pair of rods from the scrap pile, one of our engineers drilled a ½ inch hole in the end of a crankshaft of a compressor which normally furnishes air for starting the big engines in our shop and then tapped this hole for a ½ inch bolt thread. Next, he welded a nut to the crosshead end of a worn pump rod. One end of a ½ inch stud was then screwed into the threaded crankshaft, the other end being threaded into the welded nut on the end of the pump rod.

The compressor crankshaft is 1% inch in diameter and the pump rod % inch diameter. Obviously, one way to connect the pump rod to the crankshaft would be to drill and tap the crankshaft to receive the % inch rod.



Crude but effective "lathe" improvised from an air compressor, a front wheel bearing and a block of wood.

194



Williams Box "Superrenches", with their extremely thin head walls, permit fast and safe operation where clearances are limited. Offset handles clear obstructions that would otherwise bark knuckles and generally slow up the work. Their 12-point openings grip hex nuts on six sides... preventing slippage and rounding of the nuts' corners. Complete rotation of hex nuts is possible with these wrenches where handle swing is limited to as little as 30°....less than one-tenth of a full turn. Yes sir, these wrenches do guarantee more \*output per man-hour!

Williams Box "Superrenches" are made in a variety of popular patterns, including "Structural" and "Striking face" types. All are forged from tough alloy steel, heat-treated and fully guaranteed. Sold by Industrial Distributors everywhere.

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Several reasons for using a ½ inch drill and tap are as follows: (1) There was no ½ inch tap available; (2) Drilling a ½ hole would have been a chore, compared to which the ½ inch job was a picnic; (3) Due to the fact that the job was done on the floor, without dismantling the compressor, it would have been more difficult to get the ½ inch hole centered in the shaft, and any eccentricity thus introduced—by being off center—would have caused the revolving rod to wobble, with consequent difficulty in maintaining or obtaining the cylinder desired.

Reason No. 3 comes nearest to covering the decision to use the ½ inch stock for the connection. This small sized rod was centered as accurately as possible in the pump rod nut for welding, and then, after being screwed into the end of the shaft, was of small enough cross section to allow the nut to be centered by tapping the face of

the nut and slightly offsetting the smaller spindle.

Since the connection to the compressor was made through the small rod, this acted to absorb any slight misalignment of the shaft and the pump rod being turned, and prevented any vibration from being carried through the rod to a "tailstock" bearing.

The "tailstock" or outboard bearing for the rod consists of a salvaged front wheel bearing which was mounted in a block of wood, as shown in the accompanying illustration. In operation, a mechanic with a caliper, a file and a sheet of abrasive paper works the rod down to a true cylinder in a fraction of the time the job could have been done by hand.

Each reworked rod, fitted with junk rings of sheet copper to reduce clearance in the packing gland to fit the smaller rod section, is as serviceable as new rods. It has been possible to

from . . .

FLUTE GRINDER

to . . .

SAW SHARPENER

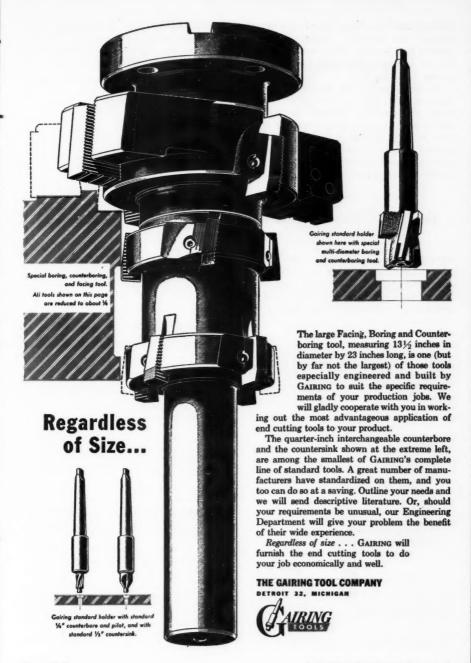
Write for Bulletin 50F.



Set the reamer or tap in the machine and forget it. Within a few minutes an accurately ground straight or spiral flute is finished — no skill necessary. Anyone can operate it. The 50F Automatic Flute Grinder is ideally adapted for fluting and gunning of taps, reamers, angular and milling cutters. In addition sharpens small metal cutting saws singly or in gangs.

THE WARDWELL

MANUFACTURING CO.



rework each rod from four to six times before the section which operates within the packing area was as small as the limiting size elsewhere on the pump rod.

In the case of our crude oil pump station, which is located many miles from the nearest machine shop, the use of a little ingenuity, together with the adaptation of means at hand, solved a troublesome maintenance problem and materially reduced the pump rod replacement bill.

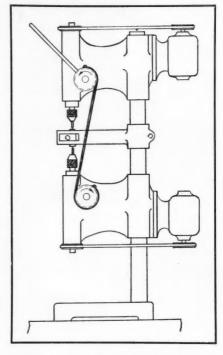
#### **Drilling Opposite Holes**

By L. KASPER

THE accompanying sketch illustrates one method of drilling a large number of pieces with opposite holes. This method was developed to replace a tumble jig which proved too slow for the work.



Referring to the illustration, two drill press heads were mounted on the same column, the lower head being re-



Sketch of Drill Press Setup for Drilling Opposite Holes

versed to drill the under side of the work. The standard drill press work table was removed and replaced with a bracket to support the drill jig. The pinion shafts of both heads were equipped with a grooved spool to which a cable was attached as shown. When the handle of the upper head is brought down, the drill in the upper head is brought down to the work, while the drill in the lower head is brought up to the work by the action of the cable on the grooved spools; thus both holes are drilled in the same movement and at the same time.

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24" and 28" Swing

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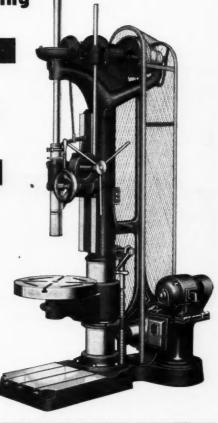
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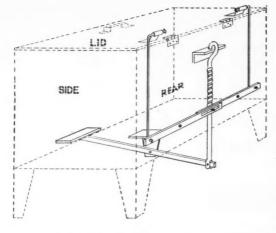
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SIBLEY MACHINE & FOUNDRY CORP.

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#### Handy Stock Cabinet

By R. A. SHAW

**D**URING a visit to the Detroit Diesel Engine Division of General Motors in Detroit, I was impressed with a method being employed for assuring clean and orderly arrangement of parts such as small pump screens, bolts, nuts, and bearings. I found these parts contained in cabinets built of convenient size with the main construction feature being a foot-controlled lid. A sketch of one of the cabinets is shown in the ac-

companying illustration.

The lid of the cabinet may be kept closed until the engine assembler wishes to remove or replace a part in the cabinet. To raise the lid he merely exerts a slight downward pressure

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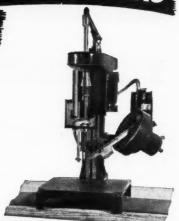
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Yes, substantial profits through reduced costs and increased production. That's what you gain by using these popular, highly efficient machines—proven through years of constant use.

MODEL A PICTURED
Drives screws from No. 2 x ½ to No. 6 x ¾.

A real production machine; drives screws at the rate of one second each. Will not mar screw heads or strip threads. TWO OTHER MODELS, driving screws from No. 6 to ¾.

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# PROSSER Carbide Grinders





For fast, efficient rough grinding and fine finishing of carbides, stellite, high speed steel, and other modern tools, install Prosser Carbide Grinders. Their rugged construction, modern design, and ease of operation insure long, depandable and profitable service.

Prosser Carbide Grinders are built in bench and floor models of several capacities, for wet or dry grinding. Attachments for chip breaker and drill grinding.

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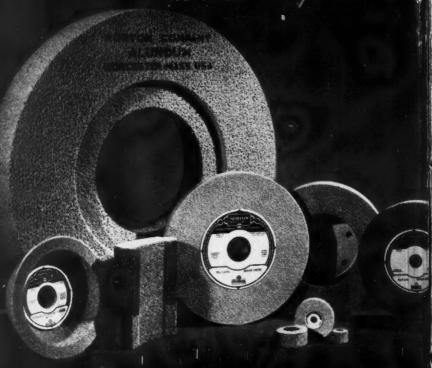
- · Quick-acting Indexing tables.
- · Adequate wet-grinding equipment.
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- Oversize wheels, giving longer wheel life, and permitting grinding of larger tools.
- · Moderate price.
- · Prompt deliveries.

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The greatest abrasive contribution to increased grinding production in over 40 years.



ABRASIVES ... GRINDING WHEELS ... GRINDING AND LAPPING MACHINE'S
REFRACTORIES ... POROUS MEDIUMS ... NON-SLIP FLOORS ... NORBIDE PRODUCTS
LABELING MACHINES BERR MANNING DIVISION COATED ARRASIVES AND SHAPPENING STONES

32 ALUNDUM abrasive is entirely new—entirely different from any other aluminum oxide abrasive. Made by a unique electric furnace process, its grains are sharper and of higher purity. We expected 32 ALUNDUM abrasive to make a real hit but it has been even more successful than anticipated. From plants everywhere are coming outstanding reports—some of them truly sensational—on the ability of 32 ALUNDUM wheels to lower grinding costs by . . .

#### cutting faster

#### 2. cutting cooler

#### 3. requiring fewer dressings

#### 4. lasting longer

If you are not already using 32 ALUNDUM grinding wheels, it will pay you to get in touch with your Norton abrasive engineer or Norton distributor at once.

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Distributors in All Principal Cities





No crushing to size is necessary with 32 ALUNDUM abrasive. The grains form as individual crystals — pointed on all sides. No matter how they are bonded into a wheel one or more cutting points are exposed.

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#### 75 YEARS OF SERVING INDUSTRY

1947 marks an important milestone in the history of The Chicago Screw Company, identifying it as a veteran leader in its field.

During its 75 years of progress, The Chicago Screw Co. has compiled a vast store of knowledge and skill that makes its products a standard of perfection in the screw fastening industry.

Apace with this growth in craftsmanship has been the constant addition of machines and tools to keep every process in Chicago Screw production the most modern known.

the highest standard of quality. Outstanding in strength, clean and true dimensionally, "Safety Plus" fastenings are ideal for modern production methods.

#### THE CHICAGO SCREW CO. 1026 S. HOMAN AVE. CHICAGO 24, ILL.

Chicago "Safety Plus" Socket Screws always represent

#### CHICAGO "Safety Plus" line includes:

**Socket Head Cap Screws Socket Set Screws** Stripper Bolts Square Head Dog Point Set Screws Pipe Plugs Keys for "Safety Plus" Products

#### Complete line includes:

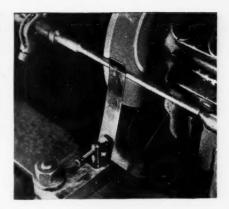
**Hexagon Head Cap Screws** Square Head Cup Point Set Screws **Headless Set Screws** Fillister Head Cap Screws Flat Head Cap Screws Taper Pins Milled Studs Semi-Finished Hexagon Nuts Semi-Finished Hexagon Castellated Nuts

with his foot on a treadle located at the front of the cabinet. Releasing the pressure on the treadle permits the lid to fall back into place. Since the workman who uses this type storage cabinet operates it with his foot, both his hands are free for other duties. By the use of this type of cabinet, engine assembly operations have been speeded up and parts have been kept free of dust and dirt while in storage.

### Spring Steady Rest Facilitates Small Rod Grinding

(Courtesy General Electric Company)

A SPRING steady rest, devised by H. Rennie of the Punching, Tool and Die Division at General Electric's Schenectady Works, has been successfully used to reduce vibration to a minimum while grinding small diameter rods to extremely close toler-

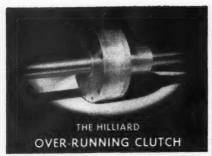


Close-up View of Spring Steady Rest in Use

ances. This useful, easily constructed device as illustrated herewith, has greatly reduced spoilage of these precision ground parts.

As shown in Fig. 1, an upright spring, attached to the end of the base





A "Free Wheeling" Clutch of simple design recognized for many years as "Standard Equipment" for Automatic Dual Drive operation—Automatic operation of 2 Speed drive—As a ratchet permitting infinite adjustment and as an automatic backstop. Furnished in a number of types.



Wherever extremely accurate control of intermittent machine operation is essential the Hilliard Single Revolution Clutch is unequalled. Its accuracy has won for it the acceptance of Industry for cutting, punching and packaging operations.



WRITE TO DAY!

For the new series of 6 illustrated Bulletins furnished FREE upon request. Featuring our complete line of Industrial Clutches and Couplings—Over-Running—Single Revolution—Friction—Centrifugal—Overload Release—Slip

THE HILLIARD CORPORATION

117 W 4th St. ELMIRA, N.Y.

Manufacturers of INDUSTRIAL CLUTCHES

by means of a bridge clamp, rests against the center of the rod under pressure, thereby giving support to the work. The bridge clamp is used to avoid weakening of the spring with screw holes, which would otherwise be necessary.

The screw which is used to adjust the pressure of the spring has a spherical end composed of a steel disc and leather pad. The leather pad provides a cushioning effect between the two metal parts and tends to absorb vibration which may be transmitted through the spring.

Pratt & Whitney-Keller Type BL Milling Machine for the automatic tracer-controlled milling of blanking, trimming, and piercing dies and punches, extrusion dies, forging dies, stamping dies and diecasting dies, plastic molds, cams, template gages, and metal patterns is the subject of a 12-page profusely illustrated circular prepared by Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Conn. The circular fully discusses the principles of operation of the machine and the various construction details, and provides a complete list of specifications. Special equipment and attachments for the unit are also shown and described. Copy of Circular No. 490 free upon request.

"Knock-Out" Expanding Mandrels for turning, grinding, and milling are illustrated and described in a catalog sheet issued by the K. O. Lee Co., Aberdeen, S. D. Specifications of the mandrels are included. Copy free upon request.

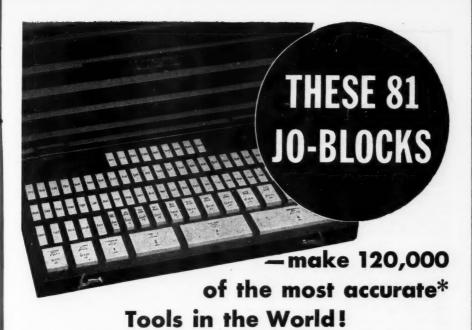
#### Erratum

In the article "Maintenance Metallizing" by Gilbert C. Close, which appeared in the April 1947 issue of this magazine, the statement was made that "electric bonders are not for sale but must be leased from the manufacturer of metallizing equipment." The manufacturer informs us that the equipment, known as "Fusebond," has been dedicated to public use and there are no restrictions whatever on the purchase or use of this electric bonding equipment for electrical surface preparation.

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(at a cost of less than 4 mills per tool—inspection standard "A")

With this popular No. 1 Set of Johansson Gage Blocks, any one of 120,000 different size gages may be made up (in a few moments), in steps of .0001", from minimum size .200" to more than 12 inches. It is thoroughly practical to extend the benefits of Jo-Block precision to include inspection of close-limits production. This is particularly true of those limited-quantity jobs which might be described as "custom-production," for which permanent gaging could easily cost more than the job itself. The cost of replacing any blocks in your set that might be thus unduly worn would be negligible by comparison. Jo-Blocks are not "too good for the job"—no tool is too good for the job, if it accomplishes it better and for less money. Write for literature.

\*Currently manufactured to accuracy standards of plus or minus .000002, .000004 and .000008 of an inch.



FORD MOTOR COMPANY JOHANSSON DIVISION

> 3607 Schaefer Road Dearborn, Mich.

# News of the Industry

#### Will Represent American Manufacturers in India

Well established firm, Harjas Mall & Co., 9, Beadon Road, Lahore, India, desires to represent on commission basis the American manufacturers, export managers and exporters of all kinds of general hardware, such as carpenters' tools, files, hinges, grinding wheels, lathe chucks, hand saws, web saws, plane irons, and so on.

#### P. M. Hall Appointed Technical Executive of Resistance Welder Manufacturers' Association

Preston M. Hall, one of the most outstanding figures in the Resistance Welding Industry, has accepted the position of Technical Executive of the Resistance Welder Manufacturers' Association, 505 Arch Street, Philadelphia 6, Pennsylvania.

A former President of that Organization (1942), Mr. Hall has long been actively interested in Association work and in the advancement of the Industry generally, serving as Chief of the Resistance Welding Section, WPB, from 1942-1945. During the summer of 1945, the Government sent Mr. Hall to England, Sweden and Germany as a Special Scientific Consultant on Welding, to investigate developments in those countries.

Mr. Hall has made an outstanding contribution to the development and advancement of Resistance Welding, by his invention of numerous machines and processes of great importance.

For the past six years, RWMA has been extremely active in the development of Standards and Specifications for Resistance Welding machines and equipment and has undertaken considerable Educational, Promotional and Research work. Under the able direction of Mr. P. M. Hall the Association is now greatly expanding this program.

Mr. Hall will be available for consultation on the production problems of metal fabricators. His wide experience and splendid knowledge of all phases of

Resistance Welding make him unusually well fitted for this new position, which will enable the Manufacturers of Resistance Welding machines and equipment to be more closely attuned to the wants and interests of the Industrial, Technical and Educational circles interested in the process.

#### Cleveland Automatic Moves To Cincinnati

Cleveland Automatic Machine Company, after more than half a century of operation at the scene of its start in Cleveland, Ohio, has been moved to new headquarters in Cincinnati, where its permanent address will be 4932 Beech Street. This marks the completion of a change started in 1944 when control of Camco was purchased by the LeBlonds of Cincinnati, a name made famous in the machine tool field by the R. K. Le-Blond Machine Tool Company, makers of a complete line of lathes. Harold R. Le-Blond became president of Cleveland Automatic at that time. In September of 1946 The LeBlond Engineering Company, which he also heads, was merged into the Cleveland Automatic Machine Company.

The company name will continue to be The Cleveland Automatic Machine Company, Mr. LeBlond states, and will be operated independently of the other LeBlond companies, continuing the production of Cleveland Automatics without interruption. The Cleveland District Sales Office will continue under the management of V. J. Hannon, with offices at 1114 N.B.C. Bldg., Cleveland 14, Ohio.

## Government Atomic Laboratory To Be Operated by General Electric

Construction of the Knolls Atomic Power Laboratory to be built near Schenectady, N. Y, by the Atomic Energy Commission will start this spring, it has been announced by L. E. Johnston, Area Engineer for the Commission. The laboratory is being erected under the supervision of the General Electric Company, which will operate it for the government

# Sant Cole



#### Sioux Portable Electric Tools

Drills - Grinders - Sanders Valve Grinding Machines Valve Seat Grinders Bench Grinders Flexible Shafts

Sioux quality and performance gives the most efficient and economical method of handling any job.

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WORLD OVER

when completed. Mr. Johnston said that scientists and engineers will probably begin to occupy the new building by the middle of 1948.

The new atomic laboratory is to be located on part of a 386-acre tract in nearby Niskayuna. On another part of the property the new General Electric Research Laboratory is now rising. The two laboratories, whose work will closely mesh, are to be operated as a unit under the direction of Dr. C. G. Suits, G-E Vice President and director of the Research Laboratory.

A number of scientists for the project have already been recruited, said Dr. Suits, and are at work in the present G-E laboratory buildings. More are being employed as rapidly as qualified men and women can be found. Physicists, metallurgists, chemists and chemical engineers, technical men of all kinds, are needed, he declared.

A number of buildings will form the Knolls Atomic Power Laboratory. In one will be located an experimental pile. Such a pile, it is expected, will form the firebox and boiler of future atomic power plants. Other buildings of the group will be devoted to offices, metallurgy, chemical engineering and chemistry. Another building will house a 3,500,000-volt elec-

trostatic, or Van de Graaff, generator, for atom-smashing studies.

#### Mechanical Engineers to Hear C. E. Wilson and Robert R. Wason

Charles E. Wilson, president of General Motors Corp., and Robert R. Wason, chairman of the board of the National Association of Manufacturers and president of the N.A.M. last year, will be among the speakers at the Semi-Annual Meeting of The American Society of Mechanical Engineers to be held in Chicago June 15 to 19. Total registration for the five days is expected to reach 3,000 exceeding previous records. Engineers will attend from all over the country, with the majority coming from the Middle West. The Stevens Hotel will be headquarters.

About 10 speakers and authors, including leading engineers, scientists, industrialists and educators, will take part in the four-day technical program, starting Monday morning, June 16. The program in general will feature the organization's 1947 theme: "The Engineer's Responsibility in Increasing National Productiv-



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#### - Wherever You Need Them!

STACKBIN sections will give you a stockroom wherever you want it—quickly and easily as building a sectional bookcase. These patented sectional storage bins nest together without the use of tools—cost you nothing to build, nothing to move. Find out today how STACKBINS can lower handling costs.

Manufactured and sold in Canada exclusively by Walter H. Wickware, Ottawa

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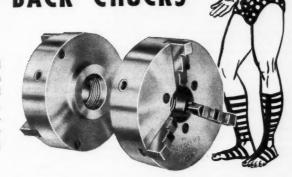
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You don't need an adapter plate



For light industrial uses and home workshops, Union's new series of Threaded Back Chucks are ideal. Mounting directly on spindles, they eliminate adapter plates. In these types and sizes:



Chuck Type	Chuck Size	Spindle Size
3-Jaw Universal, equipped with two sets of jaws	4", 5", 6", 6" Heavy Duty	1½"-8 Threads
	4", 5"	1"-8 Threads
	4", 5"	1"-10 Threads
4-Jaw Independent, with solid reversible jaws	4", 6", 6" Heavy Duty, 8"	1½"-8 Threads
	4", 6", 8"	1"-8 Threads
	4", 6", 8"	1"-10 Threads

This is one of the ways we serve the requirements of industry, and home workshops as well, with the broadest line of chucks in the world. For more than 60

years, Union has been meeting the needs of industry with progressively engineered chucks . . . built to give lastingly accurate performance.

For help with your chucking problems, call on Union's complete engineering service, or write for Catalog No. 62.



#### UNION MANUFACTURING CO.

306 Church Street, New Britain, Conn., U.S.A.



ity." There will be about 40 technical sessions.

Eugene W. O'Brien, of Atlanta, president of the ASME, widely known engineering consultant, technical publisher and educator, will speak at the president's luncheon Monday noon on "Broader Vistas." Mr. O'Brien is vice president of the W.R.C. Smith Publishing Co., of Atlanta. He served the government as engineering consultant during the war, and is a former member of the engineering faculties of Brown University and the Sheffield Scientific School.

Other luncheon speakers will include L. J. Fletcher, director of training and community relations for the Caterpillar Tractor Co., Peoria, Ill., who will speak Tuesday noon on "Citizenship" and Harold J. Rose, vice president and director of research for Bituminous Coal Research, Pittsburgh, Wednesday noon on "Trends in Solid Fuel Research."

Mr. Wilson, of General Motors, is scheduled to be heard Monday evening at the opening dinner. Mr. Wason, of the N.A.M., who is president of Manning, Maxwell and Moore, Inc., New York manufacturers of equipment for heavy industry, will speak at the banquet Wednesday evening.

Following its usual custom, The Ameri-

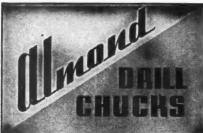
can Society of Mechanical Engineers will nominate its 1948 officers during the Semi-Annual Meeting. However the election will not take place until late fall, and will be by letter ballot of the 21,000 membership. The nominating committee will hold several meetings, the first of these to be an open hearing Monday morning, June 16.

An all-day conference of regional delegates, Saturday, June 14, will precede the meeting. Sunday will be given over to closed sessions of the Council, the ASME governing body, and its executive com-

mittee.

#### Capron and Shaw Open Offices

Edward B. Capron and Donald T. Shaw, both of whom were for many years sales agents for the Taft-Peirce Manufacturing Company, have joined to serve as manufacturers' agents with offices at 5301 Woolworth Building, New York 7, N. Y. Thus far they have arranged to handle the products of Connecticut Broach and Machine Company and Cowles Tool Company, of Cleveland. Negotiations are under way for several additional lines of cutting tools.



The Almond Three Jaw Drill Chucks were the first to be placed on the market. They were Pioneers in the field of Drill Chucks!

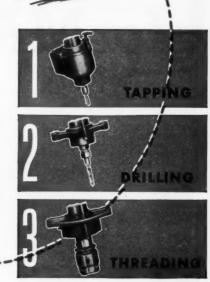
ALMOND THREE JAW DRILL CHUCKS are furnished in 9 sizes with capacities from 3/16" to 1". These are made in heavy and light duty types with a taper arbor hole or with a threaded arbor hole. For Portable Drills.

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Time-tested, quality-proven, thousands have been put into use in the past sixteen years. The Snow Air Tool — fundamental tool around which are built—the Snow Tapping Machine, the Snow Drilling Machine, the Snow Threading Machine.

Air operated—electrically controlled, it includes the latest in design. Quick-acting automatic holding fixtures are made fully automatic, semi-automatic or manually operated—all by the turn of a switch.

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Modern Marking Machines now enable most manufacturers of metal components to identify their products at trifling cost.

TRADE MARKS—
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PART NUMBERS—
PERMANENTLY ROLLED
ON YOUR PRODUCTS
WILL HELP YOU MARKET
THEM.

Send prints of parts, showing required marking and its location on part with hourly production for free recommendation.

> Illustrated at the left is Model 135 Production Marking Machine.

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## GRIPPING FORCE 15 TIMES AIR LINE PRESSURE

Speedy Air Vise helps you do dozens of operations faster, better, cheaper—by air pressure! Foot control valve opens and shuts vise instantly, leaving both hands free to produce more! Jaw opens up to 3 inches, holds castings, parts, jigs, etc. Compact, trouble-free, inexpensive.

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## Baker Model 30 HH Turning and Threading Machine

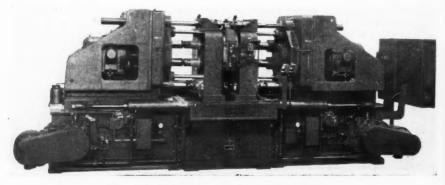
Providing an unusual method for performing turning and threading operations on a high production basis, the Baker Model 30 HH Turning and Threading Machine illustrated herewith, product of Baker Bros., Inc., Toledo, Ohio, is a two-way opposed floor type unit machine tool primarily designed for machining upper arm support steering knuckle pins. Each unit is provided with a four-spindle fixed center multiple head for hollow milling and chamfering. The heads are equipped with two additional drivers for operating lead screw spindles for external threading, using collapsible die heads. Lead nuts for the threading operation are mounted on the fixture uprights which also contain bushings for supporting tools at cutting stations two and three.

Both heads are arranged with a double motor drive; one for the four spindles, and the second motor with reversing controls for the advance and withdrawal of the lead screw. The machine is furnished with a four-station hand-indexed trunnion fixture, each station being arranged to accommodate two parts.

During the operating cycle of the Baker Model 30 HH Turning and Threading Machine, two parts are loaded and unloaded at station No. 1. At station No. 2, both ends of the knuckle pin are chamfered to a diameter of  $\frac{7}{16}$  inch and a depth of  $\frac{7}{32}$  inch. At station No. 3, the outside diameter of the pin is turned 0.7855 inch to a depth of  $\frac{7}{16}$  inches. At station No. 4, the pin is threaded to a depth of  $\frac{7}{16}$  inches on the 0.7855-inch diameter.

## Avey Nos. 1 and 2 Cam Feed Units

The Avey Drilling Machine Co., Cincinnati, Ohio, is now manufacturing adaptations of its Nos. 1 and 2 cam feed units. The machine shown in the accompanying illustration is designed particu-



Baker Model 30 HH Turning and Threading Machine

Results ARE WHAT COUNT! CLE FORGE HIGH DRILLS produce more holes per grind

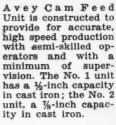
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MODERN MACHINE SHOP



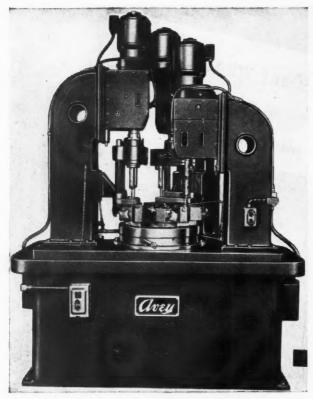
## in cast iron; the No. 2 unit, a %-inch capacity in cast iron. Bardons & Oliver

No. 22 Saddle Type Turret Lathe

Available in 3½ and 4½-inch bar capacities with 15½-inch swing over the cross slide and 23½-inch swing over the guides of the bridge type carriage, a saddle type turret lathe designated as the No. 22 has been brought out by Bardons & O liver, Inc., Cleveland 13, Ohio. For chucking work, the lathe can be equipped with a 15-

inch heavy duty scroll chuck.

Designed to eliminate belts and pulleys, the flange-mounted motor of the machine is said to deliver ample power to the work for heavy cuts at high speeds. The alloy steel heat-treated head gears and shafts with short spaces between bearings are



larly for the drilling, counterboring (reaming or redrilling), and tapping of individual holes at one work clamping. The machine is self-contained, with Avey electrical controls for operating and synchronizing multiple unit setups.

According to the manufacturer, the



218

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## Then You Need STARRETT PRECISION GROUND FLAT STOCK



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PARALLELS MACHINE PARTS SHIMS PUNCH DIES TEST GAGES SNAP GAGES TEMPLATES CUTTERS

**Buy Through Your Distributor** 

Get rolling faster by saving time on those countless jobs of making templates, test tools, gages, dies, small parts, pieces, etc.

With Starrett Precision Ground Flat Stock, you simply lay out the part and go ahead. No hunting for odd pieces of stock, no time lost in preliminary roughing or precision grinding.

## OIL OR WATER HARDENING

Available in two types; a non-deforming, spherodized annealed, electric furnace, oil hardening tool steel and a specially made, high grade, water hardening tool steel. Both made in 18 inch lengths in widths from ½ to 6 inches and in thicknesses from a sixty-fourth to an inch and more. Each piece is rust protected, stamped for type and size, and packed in a grease-proof envelope clearly marked for quick identification and with hardening instructions.

Your mill supply distributor has it in stock or write for Ground Flat Stock Folder "MD."

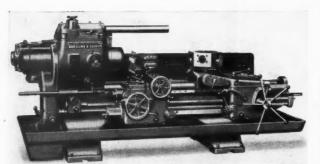
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RICISION TOOLS • DIAL INDICATORS • STEEL TAPES • GROUND FLAT STOCK HACKSAWS • BAND SAWS FOR CUTTING METAL, WOOD, PLASTICS

E T G R O U N D F L TSTOCK



Bardons & Oliver No. 22 Saddle Type Turret Lathe

claimed to afford maximum rigidity and strength to the power transmission. The lathe is provided with 12 speed changes, in geometric progression, which are preselective. The hydraulic selector valve on top of the head housing incorporates an easily-read dial indicating the spindle speed in revolutions per minute and the cutting speed in feet per minute.

A single lever on the head is used to control the start, stop, reverse, spindle brake, and gear shifting. All of these functions, including the operation of the powerful multiple disc forward and reverse clutches, are performed by hydraulic power. A geared pump built in as an integral part of the head furnishes an adequate supply of oil. The manual control lever is merely used to open

or close the hydraulic circuits that ac-

tivate the various mechanisms.

The speed changes can be made instantly without waiting for the gears of the spindle to slow down. A centrifugal governor applies the hydraulic multiple disc brake, slowing down the gears instantly to the proper speed for rapid and quiet gear shifting.

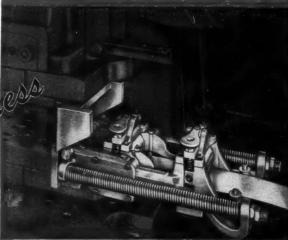
The large diameter hexagon turret is mounted on a saddle of unusual length. The opening of the ring type binder, the indexing, and the locking of the turret



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Punch
Punch
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Feeds



with the New Improved

## DICKERMAN DIE FEEDS

at Considerable Savings



Dickerman Die Feeds cost much less than oldfashioned feeds and do more accurate, faster work.

They are interchangeable — can be mounted on any type punch press.

Their flexibility allows for feeding stock from any angle — front, back, left and right of punch press.

Maintenance expense is negligible due to the absence of wearing parts, also their accurate and rugged construction.

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## CHICAGO STEEL PRESS BRAKE

New Type "300"



## SPEED PRODUCTION OF SHEET METAL WORK

USE FOR

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The New Type "300" CHICAGO STEEL PRESS is accurate, compact, and ruggedly constructed of highest quality materials. Sizes 4, 5 and 6 ft. capacities up to 10 gauge.

## DREIS & KRUMP MFG. CO.

7418 LOOMIS BLVD. . CHICAGO 36 ILLINOIS

are accomplished by hydraulic power controlled by a convenient hand lever on the saddle. The power rapid travel for the saddle on the bed, for the carriage longitudinally, and for the cross slide in and out is provided by a separate electric motor housed in a bed underneath the head.

The nine feed changes in each apron are preselective. The large diameter easily-read feed dial drums can be preset for the next cut. The shifting of the feed gears by hydraulic power is controlled by a small lever at the end of the dial drum. A sliding gear cluster in the head end gearbox makes available two feed ranges or a total of 18 changes.

The rigid forged steel square turret is remotely indexed, locked, and clamped by a lever on the cross slide. The rear of the slide is adapted to receive any one of a series of tool posts. Cutters can be mounted at both the front and rear of the work.

Individual automatic systems of lubrication serve all important bearings of the cross slide, carriage, turret, and saddle. All bearings, gears, and other parts in the two aprons are spray lubricated by integral oil reservoirs and pump systems. Similar individualized automatic lubrication systems serve the other units of the machine.

The large diameter tubular overhead pilot bar is rigidly anchored by double bearings in the head housing to form an effective and versatile support for the hexagon turret tools. The hardened alloy steel V-type bedways are firmly fastened to the box-type double-wall bed. A system of high precision stops for the carriage and saddle serves for the accurate duplication of parts. The leader and follower type screw cutting attachment for the carriage can be disengaged auto-matically for cutting threads into necked shoulders or into blind holes. The rigid precision carriage taper attachment mounted at the rear can be clamped and unclamped by a single lever conveniently located on the front of the carriage.

### LeMaire No. 20 Drilling and Boring Machine with Offset Tapping Head

Product of the LeMaire Tool & Manufacturing Co., 2657 S. Telegraph Rd., Dearborn, Mich., the LeMaire No. 20 Drilling and Boring Machine illustrated herewith is equipped with a five-station 42-inch diameter automatic hydraulic in-

Ju

## MULTIPRESS Versatility will boost your production



APID CHANGES from one operation to another with a minimum loss of operating time—you'll find this an important feature of Multipress adaptability. Using a special die-adapter on the Multipress ram, die change time can be reduced to as little as five minutes! Your production is never slowed up by prolonged "down time."

Bench-size models in 4, 6 and 8 ton capacities, plus the new 75-ton floor model, offer a wide choice of manual and automatic controls of tonnage, speed and cycling—adaptable to almost any type of production job. Accessory tooling is available for special operations.

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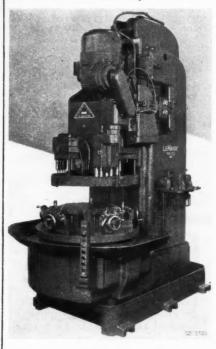
two-faced

pallets



LYON-Raymond corporation 596 Madison St. Greene, N. Y.

dex table and an offset tapping head driven by a separate motor for use in performing drilling, counterboring, and tapping operations on the pinch-bolt holes of connecting rods. The work-holding fixture is constructed to accommodate four parts and is positively clamped, using an equalizing clamping arrange-



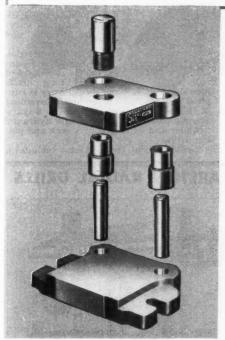
LeMaire No. 20 Drilling and Boring Machine with Offset Tapping Head

ment actuated by a single handwheel. Pilot pins on the fixture are used in locating the bushing plate for positive alignment

Said to have a production rate of approximately 725 pieces per hour at 100 per cent efficiency, the machine features a conveniently located cycle operating control box having buttons for cycle start, stop, start, and emergency return, all buttons being plainly marked. The ma-chine is constructed to eliminate chip pockets, and all locators subject to wear can be easily replaced. Helical gears are used in the drilling and tapping heads and standard hydraulic units.

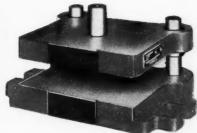
## Standard STEEL DIE SETS

## KEEP PRESSES at work!



"Standard" back pin Steel Die Sets, manufactured to extremely close limits by latest methods, are proving their worth with many users who want to increase production and reduce tool maintenance costs. All parts — die shoes, punch holders, pins and bushings—are interchangeable from stock. Without re-work or fitting... or even taking the die set off the job... any part can be quickly and economically replaced with minimum loss of productive machine time.

"Standard" Steel Die Sets are available in a complete range of sizes. Write for Catalog DS.



## STANDARD MACHINERY COMPANY

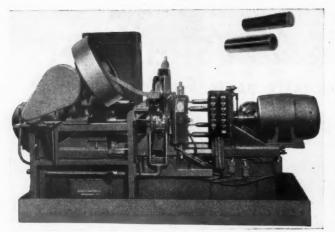
1543 ELMWOOD AVE., PROVIDENCE 7, R. 1.

CLEVELAND The Die Supply Co. 5349 St. Clair Ave. EXpress 1133

DETROIT Diemaker Supplies Co, 2679 E. Grand Blvd TRinity 1-2865 Branch Warehouses:

MONTREAL Bridge Machinery Co. 768 St. Paul St. W. LAncaster 0148 PHILADELPHIA
Fidelity Tool Supply
309 Vine St.
CAmden 4-7765

WORCESTER
Lindco, Incorporated
1023 Southbridge St.
WOrcester 6-4637



Davis & Thompson Hi-12 Automatic Horizontal Drilling and Reaming Machine

Davis & Thompson HI-12 Automatic Horizontal Drilling and Reaming Machine

Identified as the HI-12, an automatic machine designed primarily for the horizontal drilling and reaming of wrist pins

has been developed by the Davis & Thompson Co., Milwaukee 14, Wis. The design is flexible to the extent that the machine can be adapted to similar work varying in size and shape of part.

The construction of the machine includes two opposed drilling heads

mounted on a common bed. Power is supplied by two 7½ h.p. motors. Movement of the heads horizontally on the ways is accomplished through a single hydraulic cylinder and by means of a rack and pinion drive.

The design of the unit also includes a

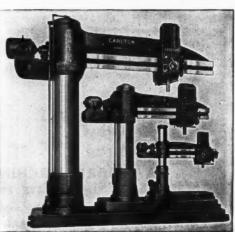
## Features:

- 1. All ball-bearing throughout
- 2. Low-Hung Drive to Spindle
- 3. Quiet running at all speeds
- 4. Requires oiling only every six months
- 5. Concentrated and convenient control
- 6. Constructed on unit principle

### MADE IN SIZES OF

- 7. 3 feet to 12 feet inclusive arm lengths
- 8. 9 inch to 26 inch column diameters.

## CARLTON RADIAL DRILLS



THE CARLTON MACHINE TOOL CO. CINCINNATI 25, OHIO, U. S. A.

# This HY-PRO Ground Thread Tap Will save money and boost production

When tapping at high speeds, this ground thread tap will usually produce at least 6 times as many threaded holes as a cut thread tap... with less power, less sharpening, less breakage.

Send for company

complete line of machine screw sizes

Prompt delivery.

Many special as well
as standard taps in stock.

Send for Catalog on company letterhead.



TOOL CO. New Bedford, Mass., U.S.A.

ed

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on ned ds pnt is hydraulic indexing fixture having six stations. Workpieces are fed from a hopper automatically and held by a direct chain clamping method. All functions of the machine are automatic, and the cycle of operation is such that after the head drive hydraulic and coolant motors have been started and the cycle start button pressed, the machine will continue in its cycle of rapid advance, feed, and rapid return. This cycle is repeated until either the cycle stop, master stop, emergency return, or safety stop button is actuated. Safety features are provided.

According to the manufacturer, the

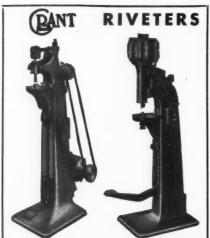
Davis & Thompson HI-12 Automatic Horizontal Drilling and Reaming Machine has a production rate of 300 pieces gross per hour. The machine weighs 6,198 pounds.

## Pratt & Whitney Model C Electro-Mechanical Lead Tester

Product of Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford, Conn., the Pratt & Whitney Model C Electro-Mechanical Lead Tester illustrated herewith is designed to check lead errors of commercial threads on a wide variety of work sizes. Workpieces up to 10 inches in diameter x 30 inches long can be held between the tailstock centers. Work longer than 30 inches and ranging from ½ to 3 inches in diameter can be easily checked by using V-block work supports. Twenty-six inches of threads can be checked in one setup. Taper threads can be checked in the same manner as straight threads, with no special setup required.

The measuring head of the Model C is a standard P & W Supermicrometer Headstock with a 1-inch spindle travel and mounted on a special base. The spindle is graduated in increments of 0.050 inch. The dial has 50 graduations of 0.001 inch each, with a vernier which reads directly to 0.0001 inch. The spindle subdivides any given inch along the work, while even inch increments are obtained by using precision end measures. Through the use of the headstock, lead ratings can be taken between each indivdual thread quickly and accurately.

The thread locating head is a standard Electrolimit universal circuit head with ball point holder and ball point. This head operates a meter which is conveniently located on the measuring head. By turning the dividing screw on the measuring heads.



 Pioneers in the riveting field. Head rivets from smallest to %" diameter, either by noiseless spinning or vibrating harmer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature—and don't forget to send samples.

THE GRANT MFG. & MACHINE CO. 96 Silliman Ave. Bridgeport 5, Conn.

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## PATENTED CUTTING OFF TOOL HOLDERS PATENTED CUTTING OFF BLADES

ONLY the PATENTED construction of LUERS cutting off BLADES germits normal expansion of bursting chips — MEANS MAXIMUM CUTTING EFFICIENCY.

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J. MILYON LUERS, 12 Pine Street, Alt. Clamans, Mich.

Produced under License Issued by John Milton Luers Patents Inc.

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Snap-on's Blue-Point Boxockets are stronger . . . safer . . . and require only half the space Here is safe, powerful leverage that invites confident wrench speed. See how easily it slips into those hard-to-get-at places . . . engaging the nut on all six corners with an encircling "no-slip, nospread" grip. Snap-on Boxockets combine speed with safety on tough nut-turning operations ... and because of their double broaching, they need only half the turning space required by an end wrench when handle movement is limited. The complete "double-offset" series contains a full range of sizes from 3/16" up to and including 31/8". Available through Snap-on's nationwide, direct-to-user tool service.

> SNAP-ON TOOLS CORPORATION 8032 - F 28th AVENUE, KENOSHA, WISCONSIN International Division: Kenosha, Wis.

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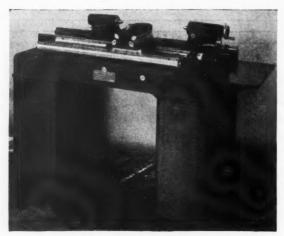
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Pratt & Whitney Model C Elec-tro-Mechanical Lead Tester

uring head, the ball point is centered in the vee of the thread. The desired measuring point is reached when the meter indicates zero. The lead is then read directly on the measuring head.

The carriage travels on a ball slide parallel with the work centers, and the cross

slide travels at right angles. The cross slide, which carthe thread locating ries head, is a spring loaded device which is said to provide the correct gaging pressure on the ball point when cen-tered in the head, regardless of the work diameter and pitch. A lock stop is provided so that the cross slide can be locked out of position when actual measurements are not being taken.

The carriage is equipped with a counterweight which is said to keep the pressure

against the end measures and measuring head constant at all times. An automatic safety stop is provided to eliminate the danger of the carriage striking the measuring head spindle anvil and thus damaging the threads of the precision measuring screw.

## SAVAGE NIBBLING MACH

FOR FAST ACCURATE CUTTING OF FLAT SHEETS BY TEMPLATE OR TO A SCRIBED LINE-TUBE SLOTTING AND SHAPING

Sheets Flat mild 34" Tough alloys %"

Tubing Wall thickness to 18 1" I.D. to 36" O.D.

## "NIBBLE YOUR COSTS"

Low initial investment. Eliminates expensive dies.

ASK FOR FREE BULLETIN "H"

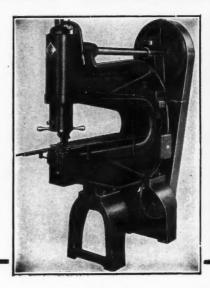
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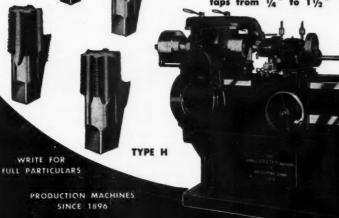


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TOUGH Threading jobs licked by COULTER TYPE "H" THREAD TAP MILLING MACHINE

NOW...comes a development that extends the capacity of this 'wonder' machine. COULTERS' are made to perform the most delicate threading operation with both speed and accuracy... 40 years of specialized experience, manufacturing precision machines exclusively. The NEW Type "H" is equipped with an overarm tail center and large collet chuck, holding the work rigidly so ONLY ONE REVOLUTION OF THE TAP is necessary.

Any number of FLUTES, eccentric or con-eccentric relief straight or taper can be produced. Pipe taps from  $\frac{1}{8}$ " to  $1\frac{1}{2}$ " and straight taps from  $\frac{1}{4}$ " to  $1\frac{1}{2}$ "



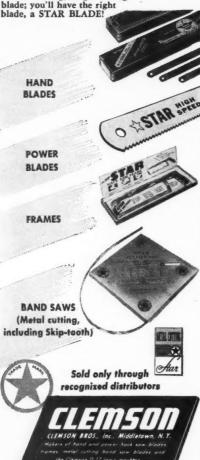
The James COULTER Machine Co.

BRIDGEPORT . CONNECTICUT . U.S.A.

## get STAR satisfaction from this complete line

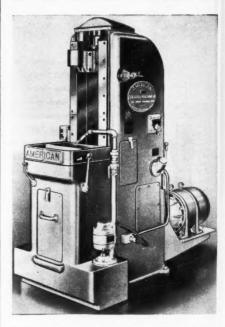
IN THE complete STAR line, there's a STAR blade for every kind of job and whatever the job, you'll find your hack saw or band saw doing it better with a STAR blade,

Tell your supplier what you want. Let him select your blade or frame from the complete STAR performanceproved line. You'll have a faster, cleaner cutting, longer lasting blades you'll have be sink!



American Improved Type T Three-Way Vertical Hydraulic Broaching Machine

The American Broach & Machine Co., 516 W. Huron St., Ann Arbor, Mich., announces changes in the design of its Type T Three-Way Vertical Hydraulic Broaching Machine. An outstanding improvement has been made in the coolant as



American Improved Type T Three-Way Vertical Hydraulic Broaching Machine

sembly, while minor changes have been made in the design of the work table.

Coolant is supplied from an enlarged reservoir located in the work table base by an integral motor and pump unit (standard equipment) located on the side of the machine below the operating lever. The mounting is such that the pumping unit can be taken out by the removal of four screws and disconnecting of inlet and discharge pipes. The inlet pipe is provided with a screen to prevent large chips from passing through the pump. The coolant discharge pipe extends 8 inches above the work table, with the shutoff valve located at table height. The control of the coolant motor



## SUPER Carbide Tipped

## SPECIAL TOOLS

SUPER Carbide Tipped STANDARD TOOLS EJECTOR-TYPE TOOLS BORING TOOLS MILLING CUTTERS SHAVING TOOLS DRILLS CENTERS GRINDER RESTS REAMERS SPOTFACERS COUNTERBORES FORM TOOLS WEAR PARTS

Get the benefit of Super's many years of experience, solely in the field of Carbide Tipped Tools.

It will pay you dividends.

Special Tools to your specifications — Carbide Tipped — Solid Carbide—all produced by Super skilled engineers and craftsmen.

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Carbide Tipped Tools

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is effected through a start and stop pushbutton station.

The American Improved Type T Three-Way Vertical Hydraulic Broaching Machine is manufactured in 4, 6, and 8-ton sizes with 24-inch stroke, and 6, 10, and 15-ton sizes with 36-inch stroke. The machine can be adapted to push, pull, and surface broaching operations with a minimum of change-over. It can also be used for arbor, straightening, and assembly work.

### Sheffield Automatic Hopper-Fed Roll Selector

An automatic hopper-fed roll selector for the economical and complete inspection of the length and diameter of small precision parts such as roller bearings, dial pins, chain links, and similar products has been developed by The Sheffield Corp., Dayton 1, Ohio. The selector can be adjusted to permit an infinite number of different sizes of parts within the capacity of the machine to be gaged quickly and with extreme precision to a tolerance of 0.0005 inch.

The Sheffield Automatic Roll Selector is



Sheffield Automatic Hopper-Fed Roll Selector

HEAVY-DUTY BENCH-TYPE Engraving machine



LIGHTER MODELS UE and UE-2
Interchangeable heads for engraving, electrical marking, and acid etching . . . available for all models. Also Panto engraving cutters, cutter grinders, master copy type, encless belts, and accessories.

Catalog on request

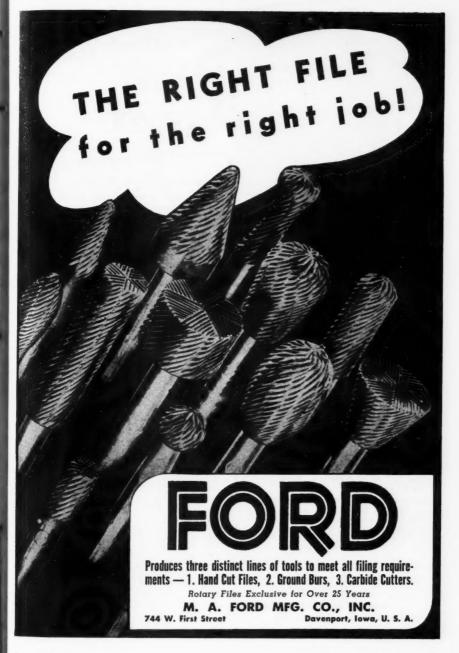
H. P. PREIS ENGRAVING MACHINE CO. 149A Summit St., Newark 4, New Jersey adjustable for accommodating diameters from  $\frac{7}{3}$  to 31/32 inch and lengths from  $\frac{7}{3}$  to 3 inches. After setting up the selector, using minimum and maximum masters or two parts known to be the correct size, the parts are placed in a hopper. All of the hopper or feed rails that contact the parts are made of the proper material to prevent the parts from congesting due to residual magnetism.

A reciprocating device picks up the parts and, by means of a gravity fed slide, they proceed to the gaging position. One Electrichek gaging head is used to check the overall length of each part while two other gaging heads are used to check the diameters at each end. During the gaging operation, each part is classified and segregated into one of four classified and segregated into one of four classifications—parts within tolerance limits, and length oversize, oversize on diameter, and undersize on either or both diameter and length. Chutes are used to pass the segregated parts into separate bins.

The automatic roll selector illustrated herewith is arranged to operate at a fixed speed for checking and segregating 3,600 parts an hour into the four classifications while gaging the three dimensions simul-

taneously.

June



June, 1947

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MODERN MACHINE SHOP



### Peterson Surface Grinder

No setup is said to be necessary to grind flat surface castings to within 0.001 inch in a minimum of time on the Peterson Surface Grinder illustrated herewith,

product of Peterson Welding Laboratories, 1423 Virginia, Kansas City, Mo. According to the manufacturer, castings can be ground by an unskilled operator by simply guiding the casting back and forth across the grinding wheel.

Peterson Surface On the Grinder, the grinding stone is mounted level and the table top is also level. Tip-toe control by means of a spider wheel permits the operator to raise the stone a maximum of 2 inches to the grinding level, leaving both hands free to handle the work. A 16-inch suction fan bolted to the underside of the grinding wheel pulls grinding dust down and deposits it in two dust collectors.

Designed for machine shops and foundries, the Peterson Grinder is available in two models; namely, the 1A, equipped with a 14-inch stone and 3 h.p. motor, and the 2A, equipped with a 16-inch stone

and 5 h.p. motor.

## **BENDS PIPE EASILY and** QUICKLY at FIXED RADII

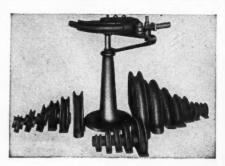
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## Cold Pipe, Conduit and Tube **Bending Machines**

Twelve types to select from. Hand operated capacities 1/4" to 6" inclusive. Motor operated 1/2" to 8" inclusive.

A few of our More Than 12,000 Customers:

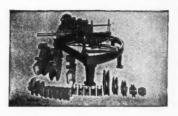
Bureau of Ships, Wash., D. C.; Henry J. Kaiser Co., Paci-fic Bridge Co.; Bethlehom-Hingham Shipyards; Horcules Pewder Co.; Stone & Webster; E. L. Du Pent de Nemours & Co.; Westinghouse Elec.; General Motors; Henry Ford Co.



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June

**NEW** features that mean

**Better Tapping** 

This new high speed Procunier Tapping Head is the answer to your toughest tapping problems. It is a precision machine which assures greater tapping accuracy at high speed—with less tap breakage. Check these new Procunier features:

New double-cone cork faced friction clutch engages the conical surfaces of the drive and reverse shells, driving the tap with a soft "cushioned" action.

New clutch instantly "slips" if tap strikes bottom or sticks — reducing tap breakage.

✓ High sensitivity of Procunier Tapping Head makes it possible to quickly detect dull or "loaded" taps by the pressure needed to drive them.

✓ Procunier Tapping Heads have heat treated gear mechanism, ball bearings, light weight aluminum housings as well as many other advanced features.

A complete line of Procunier Tapping Heads is available, including Cover Clamping models — write today for illustrated bulletins.

## **Procunier**

Safety Chuck Company

12 S. Clinton St.

Chicago 6, III.



New Procunier "Tru-Grip" Tap Holder

Cross section of "Tru-Grip," showing positive drive to tap.



Send me bulletins on

- ☐ Procunier High Speed Tapping Heads
- ☐ Procunier "True-Grip" Tap Holders
- ☐ Universal Tapping Machines

Name -

| Address \_

City

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## - Feris it is.

RUGGED, light and compact—featuring positive drive and accuracy—this new type Tap huck is ideal for use on all types of tapping heads and tapping machines. Lightness and compactness mean less torsional inertia on the spindle which contributes greatly towards reducing tap breakage—particularly in bottom tapping—and allows for quicker stopping and reversing of the tapping spindle. The heart of this chuck is the Jacobs Rubber-Flex Collet. Made as a single unit, the Rubber-Flex Collet is comprised of several hardened steel iaws per-

manently bonded into a synthetic rubber body. All working surfaces of this collet are precision ground after moulding and the collet is centralized by a ground conical bore in the chuck body, assuring extreme concentricity. Because the jaws of the Rubber-Flex Collet are rigid steel pieces ground to a fixed shape and all flexing is assumed by the resilient synthetic rubber web separating the jaws, parallelism of the jaw bites is assured throughout the entire range of the collet so that the smallest tap is held as firmly and as accurately as the largest.



## BRAND NEW!

MADE WITH THE JACOBS RUBBER-FLEX COLLET

OUTON THESE SPECIAL FEATURES!



### SMALL DIAMETER

Combined with light weight keep to a minimum the torsional inertia a holder builds up on a tapping spindle.



Floating back jaws provide positive drive on all sizes of tap squares.



## GREATER GRIPPING POWER The parallel bite of the

The parallel bite of the Rubber-Flex Collet prevents disengagement of the positive drive.

## SIMPLIFIED TAP CHANGING

Quarter turn of cap and the jaw screw disengages tap from chuck. Large sight hole facilitates tap changing.



## GREATER ACCURACY

Completely ground collet and chuck body give unusual control of run-out.

### WIDE COLLET RANGE

One collet takes all taps in its range. No individual sleeves or changing required.



For prices and complete specifications of this new chuck ask your Industrial Supply Distributor for Jacobs catalogue 47-T.



HE JACOBS MANUFACTURING COMPANY



The RPM's stay up while grinding... not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind — not just rub. The speed of Kipp air grinders drops but slightly when put to work. That means better work—longer wheel life.

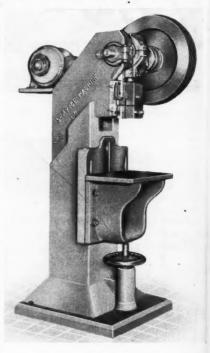
Buy Kipp air tools for best results, lower prices.





### Rousselle 15-Ton Horn Press

Described as extremely flexible in application and adaptable to a wide range of work, a 15-ton horn press of adjustable bed design is now being marketed under the trade name of Rousselle by the Service Machine Co., 7627 S. Ashland Ave., Chicago 20, Ill. The outstanding feature



Rousselle 15-Ton Horn Press

of the unit is the bed table which can be raised or lowered to provide whatever die space is required. The maximum die space obtainable is 13 inches and the minimum is 5½ inches. The working surface of the bed table is 11 x 15 inches.

The press can also be provided with a 2-inch horn hole which can be used when the table is removed. The bed table may be bored for blanking jobs without interference with the elevation screw.

The crankshaft is of the eccentric type, having a large diameter at the crankpin so as to reduce bearing pressure and increase rigidity. The press has a standard stroke of 2 inches but can also be ob-



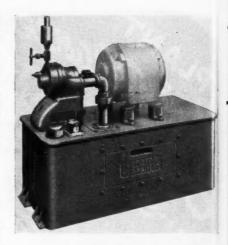


tained with any length of stroke up to 3 inches on order. An automatic knockout bar and non-repeating clutch are included as standard equipment.

The press ram is a rugged semi-steel casting which is proportioned to provide maximum rigidity and special reinforcements in the bearings and throat. The main shaft bearings are large and can be easily replaced. The flywheel is of solid type construction. Alloy steel inserts or wheel pins in the flywheel engage the special round type alloy steel clutch pin. The flywheel can also be furnished with roller bearings.

## Gerotor Improved Hydraulic Pump Unit

The availability of an improved hydraulic pump unit which is designed to handle a steady oil flow at continuous ing pressures up to 1,000 p.s.l. is announced by the Gerotor May Corp., Maryland Ave. and Oliver St., Baltimore 3, Md. Embodying a Gerotor hydraulic pump of various avilable sizes, the unit is supplied complete with a dustproof, easyto-clean tank; combination filler, screen and breather cap; graduated oil level in-



Gerotor Improved Hydraulic Pump Unit

dicator; pressure gage and gage shutoff valve; adjustable relief valve; flexible coupling; and all necessary piping. The unit is furnished standard for N.E.M.A.





This new Heim Roller Bearing Pillow Block provides a low cost, highly efficient means of supporting any revolving shaft. It represents the application of a rugged base and metal strap to the well known Heim Flanged Type Self Contained Roller Bearing to make a Pillow Block of extreme simplicity. Stock sizes for shaft diameters up to one inch.

The rollers are kept dust free by the flanged construction of the outer casing and the inner roller race, which also retains the lubrication. Full length rollers provide maximum load carrying capacity. May be mounted upright, vertically, horizontally, or at any angle. Please write for bulletin of complete data with specifications and list of stock sizes.

Unibal Spherical Bearings

THE HEIM FAIRFIELD



Rod Ends . . . Die Polishing machines

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Every Forsberg Blade bears the famous WHALE BRAND mark of quality. Scientific heat treating and thorough check every step of the way, plus a severe bending pounds test gives Forsberg Blades superior performance. The popular HY-FLEX Blade meets today's demand for extreme flexibility at medium price—it has the guts for solid service.



A Whale of a Blade—MO-HY'S special molybdenum steel gives unusual cutting service—same speed as tungsten with comparable performance. For outstanding results on stubborn jobs, ask your mill supply house for WHALE BRAND HY-FLEX and MO-HY BLADES.



frame motors, however, special motors can be mounted if required.

The Gerotor Hydraulic Pump Unit with single pump (Series 9100) is designed to operate at 1,200 or 1,800 r.p.m. and is available in tank capacities of 4½, 10, 17, 35, 60, and 100 gallons. Units with double pumps for two separate circuits (Series 9200) are constructed to, operate at 1,200 r.p.m. and are offered in tank capacities of 10, 17½, 35, 60, and 100 gallons.

## Lindberg Air-Cooled Transformer

Designed for use with electric furnaces, for testing functions, and various applications requiring heavy current, an air-



Lindberg 50 Kva Air-Cooled Transformer

cooled transformer featuring a built-in wiring compartment and terminal board to provide for ease of installation is now being manufactured by the Lindberg Engineering Co., 2444 W. Hubbard St., Chicago 12, Illinois.

The transformer is available in sizes rated from 1 to 100 kva, up to 600 volts, single phase, 3 phase, or 3 to 2 phase. Tap switches to handle up to 500 amperes are available for all sizes of the transformer.

## Siefen Air-Operated Spray Gun

An air-operated spray gun especially designed for use in spraying liquid compound on buffing wheels is now being manufactured by the J. J. Siefen Co.,

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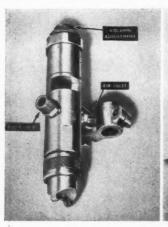
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(Left) Siefen Air-Operated Spray Gun.
(Right) Siefen Air-Operated Spray Gun set up for applying liquid compound to a buffing wheel.

So

pany, entitled "The Siefen Method of Spraying Buffling and Polishing Compounds," provides complete information on the setting up and operation of the Seifen Air-Operated Spray Gun.

5657 Lauderdale, Detroit, Mich. The gun is adjustable for controlling the volume of liquid compound applied to the buffing wheel and is operated by means of a foot valve to which is connected an air pressure regulator. A quart gravity cup is provided for holding the liquid buffing compound.

A book now available from the com-

## Elser Reciprocating Tool Attachment

Said to be ideal for machine, pattern and production shops, plastic manufacturers, manual training schools, and home hobby shops, a reciprocating tool attachment for drill presses and other shop equipment is now being marketed





spindle speed range.

The silent chain drive is just another of the many features that make the Model M-30 a favorite for both tool room and production

milling operations.

For greatest economy in milling machines ask about both Diamond Models M-20 and M-30. Specifications of each are given below.

Write for free bulletins!

MODEL	TABLE	LONG. TRAVEL	TRANS- VERSE TRAVEL	VERTICAL TRAVEL	SPINDLE	TYPE OF DRIVE	MOTOR	NET WEIGHT
M-30	7" × 30"	18"	6"	10"	Variable 75 to 1200 RPM	Variable	1½ hp Fur- nished	1300 Lbs.
M-20	51/2" × 20"	12"	6"	9"	6 speeds 100-1400 RPM		3/4 hp Recom- mended	

## DIAMOND MACHINE TOOL CO.

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MODEL M-30

## ROGERS

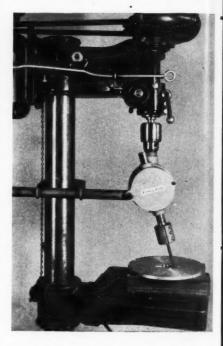
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Α L G R E A 5 M D T E R S B 0 OPTIONA R P E ı E A C T

## THE JOHN M. ROGERS TOOL CORPORATION

GLOUCESTER CITY, NEW JERSEY

by The Elser Tool Co., 23902 Van Born Rd., Dearborn, Mich. Installed on any standard drill press, the attachment, it is claimed, can be used in filing, sawing, lapping, honing, slotting, punching, stamping, riveting, and marking operations. In a vertical mill, it can be used to precision shape or slot dies, punches,



Elser Reciprocating Tool Attachment set up on drill press for filing at an angle

stripper plates, keyways, and gears.

The Elser Reciprocating Tool Attachment is adjustable to do as much as 30 deg. each side of center. The speed range and depth of throat are limited only by the capacity of the machine with which the attachment is used. The holding clamp is designed to fit any drill press with a round column up to 3¾ inches; the spindle is constructed to fit any ½-inch capacity drill chuck. The attachment may be used with any standard hack saw blade, and the %-inch hole through the toolholder permits full length use of all files. The length of the stroke is fixed at 1½ inches. The attachment is of fully enclosed design.

Firthaloy This difficult opera-

This difficult operation,—a one-draw, severe reduction, required a correctly designed die with Firthaloy for wear resistance in the hole, and hardened top face for wear resistance against wrinkling.

There's more to a good deep drawing die than simply a carbide insert in a steel casing. Firthaloy engineering skill based on past experience in the deep-drawing field; correct design based on established practice; proper selection of materials; accurate specifications to meet the individual needs of the case . . . are reasons why FIRTHALOY DIES assure size control, surface finish, trouble-free operation, long life and low die cost per piece.







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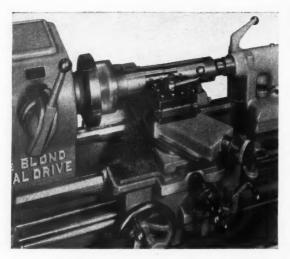
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Enco Model L-4½ Tool Post Turret

Designated as the Model L-4½, a tool post turret designed especially for the LeBlond Dual Drive Lathe has been an-

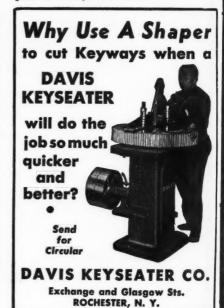
Illustration showing Enco Model L-4½ Tool Post Turret mounted on a LeBlond Dual Drive Lathe. Each tool has three different working positions and may be used for more than one operation.

nounced by the Enco Manufacturing Co., 4922 Fullerton Ave., Chicago 39, Ill. The turret is said to afford rigidity for carbide-tipped tools which are supported by a flat base and clamped with at least three screws.

The Enco Model L-4½
Tool Post Turret is designed
to accommodate tools up to
½ x 1 inch. A quick setup
for threading is provided by
the 12 stations and 30-deg.
indexing. Each tool mounted
has three different working

positions and may be used for more than one operation. An equalizer spring maintains the tool block and clamping lever in constant contact, thus eliminating chip clearance and making indexing quick and easy, it is claimed.





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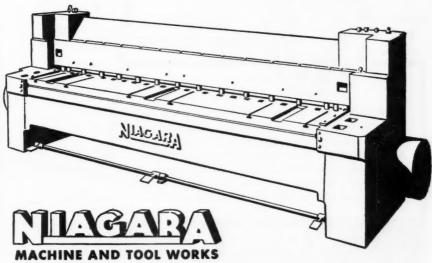
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## Great Names in America's Progress

George Westinghouse

• The name George Westinghouse is an honored name not only in industry but in many industries. First prominent through the invention of the air brake, the name and genius of Westinghouse is associated with hundreds of other products known for utility, performance and service to people everywhere. Niagara presses, shears and other machines for working sheet metal are important in the production of an infinite number of products bearing the Westinghouse name. Men responsible for production economy are invited to look into the advanced design of Niagara machines.

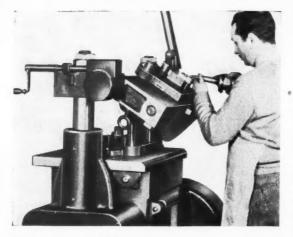


District Offices: CLEVELAND . NEW YORK . DETROIT

Buffalo 11, N. Y.

1947

683 Northland Ave.



Alpha Model 40 Tryout Pres with head tilted to permit corrections on punch without removing from press

trated herewith is now being manufactured by the Alpha Tool Works, 6446 Beechton, Detroit 10, Mich. If desired, the press can also be used for production pur-

An outstanding advantage of the Alpha Model 40 Press is that necessary finishing work can be performed on both male and female members without removing them from the press. Position pins are retractable by means of a crank, thus allowing the

bolster and head to be tilted so that the die is made easily accessible for work. When corrections are completed, the die returns to its original position for the accurate checking of the corrections.

### Alpha Model 40 Die Tryout Press

Intended for use in trying dies under actual production conditions and to make die finishing easy, fast, and accurate, the Alpha Model 40 Die Tryout Press illus-

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ACCEPTED!

**THREAD** RING GAGES

No wonder more and more industries are adopting this gage as standard. Its revolutionary design assures wear life 5 to 7 times longer. And maintains accurate inspection. Just try the Woodworth Thread Ring Gage on your extra tough job-and you, too, will standardize!

Wire or write for folder No. 46R at no obligation.

5-PLUS **FEATURES** 

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> benchmaster mill with horizontal spindle overarm

### SAVES VALUABLE SPACE-CUTS DOWN EQUIPMENT COSTS

Now you can obtain a precision perfect, high-speed benchmaster milling machine that's easily convertible from a horizontal to a vertical miller by simply interchanging spindle attachments. Its unusual versatility, plus the usual quality-plus benchmaster workmanship, make this double-duty milling machine an outstanding addition to your shop.

Specifications: Table size - 6"x 14"-Three Tee Slots 3/4". 2" center Longitudinal travel 81/2"-Traverse travel 51/2"-Vertical travel 81/2" on vertical mill-91/2" horizontal mill-Height 28" -Weight (less motor) 215 lbs.-Requires ½ h.p. motor-Spindle speeds (standard 1725 rpm motor) 450-850-1400-2100 rpm.

For complete information write to Dept. MM-6.

benchmaster MANUFACTURING COMPANY
2952 WEST PICO BOULEVARD
LOS ANGELES & CALIFORNIA



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Specifications of the Alpha Model 40 Die Tryout Press are as follows: capacity, 40 tons; stroke, 3% inches; strokes per minute, 100; maximum shut height, The bolster can be tilted to permit additional work on die.

8 inches: minimum shut height, 6 inches; and clearance between columns, 27

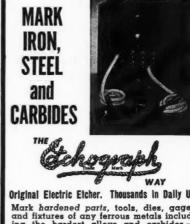
### Denison 75-Ton Multipress

Featuring varied ram action controls, the Denison 75-Ton Multipress illustrated herewith has been brought out by The Denison Engineering Co., 1160 Dublin Rd., Columbus 16, Ohio. With a choice of three valve combinations, the four-strain rod press is said to meet practi-

cally every pressing cycle need within a 75-ton range.

Operating characteristics of the press include automatic or manual ram cyc-





Original Electric Etcher. Thousands in Daily Use

Mark hardened parts, tools, dies, gages and fixtures of any ferrous metals including the hardest alloys and carbides—quickly—plainly. • Three sizes to meet all requirements.

· Write for circulars and prices.

BREWSTER-SQUIRES CO.

Hudson Terminal Bldg. New York 7, N. Y.

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Grinding Wheels are hand dressed fastest with revolving cutter type dressers. And Vincent Dressers add to this saving in dressing time, a bonus of many added dressings per cutter.

Made of special alloy steel — heat-treated to exact hardness by an exclusive process, Vincent Cutters give quality dressings and longer service life. Broken or mushed

over teeth are eliminated, even on the toughest applications.

Vincent Dressers and Cutters are made in styles and sizes to meet your every hand dressing need. Your mill supply house carries a complete stock.



### VINCENT "AA" HSS TOOL BITS

Vincent HSS Tool Bits are also heat-treated in the Vincent Steel treating plant. Their fine performance consistently produces more parts per tool grind. Try them on your lathes and screw machines. Available in standard sizes from 3/16" sq. to 3/4" sq.

Heat Treaters of Metals-300 Tons Capacity Daily

Lucers of GRINDING WHEEL DRESSERS AND CUTTERS CONICAL CUTTERS AND HOLDERS . DIAMOND DRESSING TOOLS HIGHWAY SURFACER CUTTERS TUBE CLEANER CUTTERS

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■ Good tools make any job easier—make any man a better craftsman. That's why Haskins portable flexible shaft tools are so often the choice of skilled production line men. They know tools: and they know that Haskins machines will simplify all their work—buffing, grinding, polishing, drum and disc sanding.

Whether your problem is finishing die castings or fabricating with stainless steel, Haskins tools can help you get improved craftsmanship in your shop.

Write for Catalog. R. G. Haskins Company, 2647 W. Harrison Street, Chicago 12, Illinois.

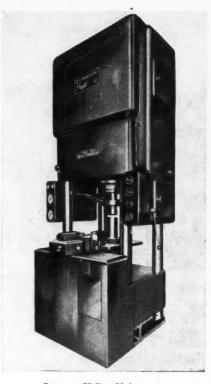


HS-4; widely used in fabrication of all steels; ½ h.p. multispeed, countershaft unit, 1500 to 7800 R.P.M., mounted bench height on caster base, 360°

swivel. One of many models.

FLEXIBLE SHAFT EQUIPMEN

ling; fast traverse-slow pressing speed; pressure and distance reversal; low ram tonnage, if desired, with high return and accessory pressures; large tooling area; convenient one-man operation; 30-inch daylight opening and 18-inch stroke; pressurized filter system; and convenient arrangement of all adjustments and op-



Denison 75-Ton Multipress

erating controls and gages at the operator's finger tips. The machine can be easily adjusted to provide a pressure variance of from 7½ to 75 tons, thus making it readily adaptable to a wide variety of different applications.

### Bellevue Gas Producer

A gas producer that is designed to generate a prepared atmosphere by partially burning (exothermic reaction) natural, artificial, or propane gas is announced by

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## EEDS THE ASSEMBLY LINE

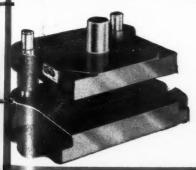
The Assembly Line-symbol of American Mass Productiondepends on a rapid and constant flow of finished parts to each stage of the assembly.

Largely responsible for keeping the line moving, Presses provide the fast, all-around production of duplicated metal parts that modern standards of production demand.

Danly Die Sets-a necessary part of good Presswork everywhere-speed die making programs, protect costly dies, cut down time for regrinds. Danly Die Sets and Die Makers' Supplies are nationally recognized for known dependable accuracy.

DANLY MACHINE SPECIALTIES, INC. 2100 South 52nd Avenue Chicago 50, Illinois





# National Assembly

MILWAUKEE 2

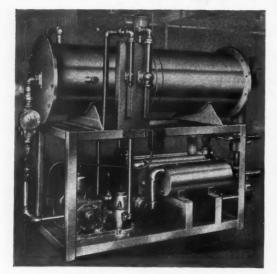
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DIE MAKERS SUPPLIES

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Welded Steel Pabrication

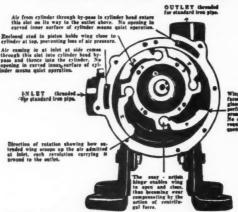


the Bellevue Industrial Furnace Co., 2971 Bellevue Ave., Detroit 7, Mich. When artificial or manufactured gas is used, means must be provided for the removal of sulphur and its compounds. The airgas ratio used to produce the desired atmosphere is set by means of the micrometer adjusting valve of the precision gas mixing controller. The gasair mixture is then passed through a fire check valve and into the burner and burned within the primary and secondary chambers. The water vapor is condensed out of the prepared protective atmosphere by water-cooled condensers and collected by means of water traps.

The combustion chambers of the Bellevue Gas Producer are provided with a water jacket that contributes to long life of the refractory lining of both the primary and secondary combustion chambers. Specific protective gas at mospheres

having high hydrogen content with airgas ratio of 5 to 10 (air) to 1 (natural gas) may be provided by the use of a special catalyst in the secondary combustion chamber.

### LEIMAN BROS. ROTARY VACUUM PUMPS



Noiseless • Powerful

Efficient

THEY TAKE UP THEIR OWN WEAR

Machine Designers Secure Good Results When They Use the Standard Rotary Vacuum Pump of All Industry

Made in many sizes to fit any purpose or any dimensions—used in all industries for picking up and carrying sheets of paper, cardboard, tin or other materials; handling liquids by vacuum or pressure as in bottle filling operations; also for agitating solutions; aerating water as in fish aquariums and elsewhere. They operate

machines, cooling linetype machine molds, gas and oil burning appliances, furnaces, blowpipes, etc., used in hospitals for etherizing, vacuum treatments, wound cleaning in operations; all sorts of operations in filling bags, cartons, collapsible tubes, and containers of all sorts; for creating instant and high heat in steam radiators; for vacuum holding chucks and for hundreds of other uses.

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SPECIAL COLD FORGED PARTS . STANDARD CAP SCREWS . HARDENED AND PRECISION GROUND PARTS SHEET METAL DIES FROM THE LARGEST TO THE SMALLEST . JIGS . FIXTURES . STEAM HEATED PLASTIC MOLDS SPECIAL PRODUCTION TOOLS . R.B INTERCHANGEABLE PUNCHES AND DIES . DIE MAKERS SUPPLIES

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The Bellevue Gas Producer is available in sizes to generate 350, 650, 2,000, 3,500, 9,000, and up to 60,000 cubic feet per hour. The unit is claimed to be useful in bright or clean annealing over long time cycles where a bright surface is desired on low carbon steel, copper, and copper alloys; the sintering of low carbon steel mixtures in powder metallurgy; the sintering of non-ferrous mixtures in powder metallurgy; and other applications. When lower than normal water content is desired in the protective gas atmosphere, the gas producer may be supplied with a refrigerating unit.

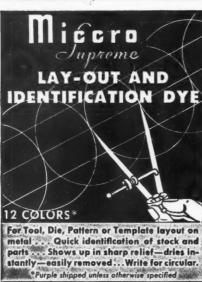


### GRAY TURRET HEAD METAL CUTTER OR NIBBLER

N.A.M. Pioneer Award Given to Gray

Most modern Nibbler for Template Cutting, Tool Rooms, Shipbuilding, Aircraft Parts, Aircraft Tubing, Sheet & Plate Shops.

GRAY MACHINE CO. Box 596, Philadelphia, Pa



### Size Control Chrome-Plated Thread Wires

Featuring u n u s u a l l y long-wearing qualities, chrome-plated high speed steel thread, gear, and spline wires with a tol-



Size Control Chrome-Plated Thread Wires

erance of 0.000025 inch are now being offered by the Size Control Co., 2500 Washington Blvd., Chicago 12, Ill. According to the manufacturer, the wires combine the long-wearing properties of chrome with the elasticity of high speed steel wires, thus assuring efficiency and economy for all-around use.

For more careful use by experienced inspectors, carbide wires which are claimed to provide many times the wear of the chrome-plated high speed steel

wires are also available.

### Logan Redesigned Four-Way Air Control Valves

Completely redesigned and now available in 79 standard models, an improved four-way air control valve of the sliding piston-type is announced by the Logansport Machine Co., Inc., 905 Center Ave., Logansport, Ind. According to the manu-





Sizes 12", 14", 16", 18", 20" and 24" wheels.

Ask for Descriptive Circular

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MODERN MACHINE SHOP

MICHIGAN CHROME & CHEMICAL COMPANY

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### ... Johnston & Jennings Specifies NOPAK 5-Way Manifold Valves

"U.S." Jolt Roll-Over, Pattern-Draw Molding Machines are built for continuous, rugged service under arduous working conditions. Smooth, controlled

sequence of cylinder action is required to actuate the heavy rollover mechanism hundreds of times a day, with a minimum of wear, shock, and vibration.

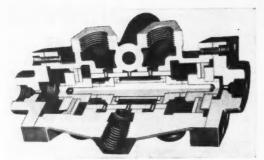
NOPAK Valves are ideally suited to this purpose because the valve disc rotates at right angles to the stream flow. This basic NOPAK principle provides positive control through the complete cycle of valve operation...from slow, gradual, throttling action to immediate opening of full pipe area...without damaging shock or impact.

Specify NOPAK Valves for smooth, shockless control of air or hydraulic power, either in your plant equipment or machines you build for resale.

GALLAND-HENNING MFG. CO., 2758 S. 31st St., Milwaukee 7, Wis.



Above: Close-up view of NOPAK ½" 5-position Manifold Valve. This is essentially a 3-way valve for staggered actuation of 2 single-acting cylinders.



Cutaway view of horizontal piston type valve, available for bleeder and pilot pressure operation

facturer, the valve may be used in manufacturing and processing operations of all kinds, as well as for original installation in air-operated equipment on the market.

To provide convenient, effective regulation for every job, the Logan Four-Way Air Control Valve is offered in a wide range of control types. These include direct-operated models which can be arranged for control with a straight or bent handle; finger-type or palm-type

push button; toggle; foot treadle; cam; or built-in air cylinder. Also available are remote-operated models for activation by limit switches or push buttons, two-way bleeder valves, or four or three-way pilot operating valves.

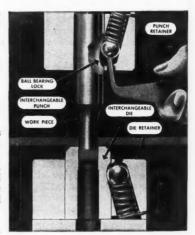
Effortless operation of the Logan Redesigned Valve is said to be assured, since the balanced construction produces equal pressure on both sides of the piston. The piston is light in weight, permitting high speed operation and rapid reversals, particularly in the electric-operated models. Rapid response also results from the full pipe size of ports and internal air passages, permitting unrestricted air flow. Long sealing life is obtained through a self-cleaning construction, which wipes piston walls clean of

# PUNCHES and DIES

INTERCHANGEABLE

Allied's R-B Interchangeable Punches and Dies are quickly installed for trouble-free production in the metal-working and plastics industries. They are available from stock in *standard* round, oblong and square shapes of almost any required size. Specials of any size, shape or material are promptly furnished to your specifications—and delivery dates are *dependable*.

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HOLES

- A NEW MACHINING METHOD! ROTARY BROACHING \*
- · A NEW NAME-"ROTARY BROACH" \*

ROTARY BROACHES may be used in lathes, turret lathes, automatics, drill presses, etc., to replace reamers. They produce perfect holes with finishes that can only be compared to honing. They last longer before grinding is necessary and may be resharpened 10 to 30 times. They produce perfect holes at a fraction of the cost of those produced by other methods. Eliminates grinding, lapping, honing and boring.

USE THIS NEW MACHINING METHOD-ROTARY BROACHING\* You Cannot Afford Not To Use Rotary Broaches (Write for free descriptive literature) \* "Rotary Broach" and "Rotary Broaching" are new names coined and copyrighted by Shearcut Tool Company.

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### SHEARCUT TOOL COMPANY

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abrasive particles with every piston movement. Durable synthetic rubber cup packings assure positive action without leakage, it is claimed.

When desirable, cup packings can be replaced without disturbing pipe connections. After the top or end cover screws are taken out, the piston can be removed and replaced instantly.

Foot and manifold mountings are available for the manual, cam, and electric-operated valves. With the manifold mounting, concealed piping may be brought in through the mounting surface, thus permitting several valves to

## SIMPLE — FAST — ACCURATE LOCATING



Place instrument in spindle of boring mill (vertical or horizontal), drill press or jig borer.

### AST

200 - 1000 r. p. m. Bring thumb nail to bear against centering bead until it runs true. Stop machine and focus on work. Keep eye at least 4 inches from viewing aperture.

### ACCURATE

Locate cross lines on work to match lines in viewing aperture.

Write for catalogue No. 12

### CENTER SCOPE PRODUCTS

3829 San Fernando Rd., Glendale 4, Calif.



Cutaway view of vertical piston type valve, available for hand, foot, cam and electric operation

be located close together. Manually operated valves are also made with a flange mounting in which the valve body is recessed into the mounting surface and piping is concealed. Light duty ¼-inch port valves are supplied with both foot and side mountings.

The hand-operated valves have universal handles, independent of the valve mechanism. Consequently, the top cover can be rotated to place the handle in any of four positions at 90-deg. intervals. Since parts are interchangeable, these valves can be quickly reconverted for other uses. Straight handles can be substituted for the bent type; spring return to the top can be converted to spring return to the bottom; handles using ball



## ELECTRIC ETCHER

SPECIFICATIONS—Navy bronze contact plate; Aluminum alloy case 4" x 8" x 10"; Weight 22 pounds; Recessed, heavy duty heat selector switch and pilot light; Handy cord storage compartment; Special current regulating transformer gives smooth etching action with the offset, coolgrip stylus. For operation on regular 110-volt AC lighting circuits. Fully guaranteed. Price \$67.50. Immediate delivery.

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## Actually There's NO TRICK to Reducing Milling Costs!

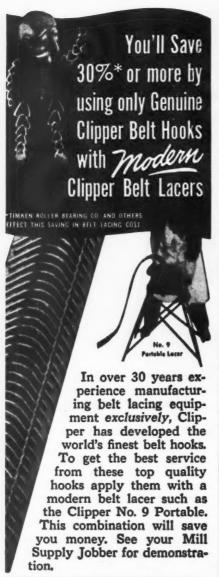
Your milling costs can be cut to a minimum by using Kempsmith Standard Attachments to increase the productiveness of your standard milling machines.

57 years of specialized experience has given Kempsmith the necessary "know-how" to turn out dependable, precision-built Attachments, Arbors and Accessories.

Eempsmith Standard Attachments are made to perform the most delicate milling operations with both speed and accuracy. Why not investigate the cost-saving possibilities of these sturdy, time-proven tools? Write, today, for literature.

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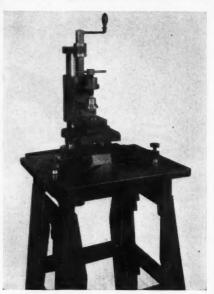
CLIPPER BELT LACER COMPANY, Grand Rapids 2, Michigan



detent can be changed over to spring return; and vice versa. All valves in the line are designed for operation at pressures up to 150 pounds per square inch.

### **Producto Punch Holder Remover**

Designed to remove punch holders from die beds and separate dies that have been assembled together for some time, the



Producto Punch Holder Remover

Producto Punch Holder Remover illustrated herewith has been brought out by The Producto Machine Co., Bridgeport 1, Conn. The machine can also be used for shearing in small punches and dies and for general utility around a toolroom.

As shown, the machine is arranged to grasp the punch holder around the shank by simply clamping the movable holder around the shank and then lifting the punch holder off the liner pins and the punch out of the die. It is also arranged so that if the punch holder has no shank, the machine can grip the punch holder proper by screwing down the auxiliary screw. Thus, punch holders can be removed whether they have shanks or not and punches can be sheared in with a punch holder that does or does not have a shank.

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## HEAT TREAT SMALL PARTS

In Your Own Plant

- Install anywhere by simple wire connection.
   Quiet in operation. No fumes or odors—no ventilating required.
- Any intelligent man can operate furnace with automatic temperature control, using established procedures.
- Operating cost under 4¢ per hour to hold 1600° F. in Model 3 furnaces, with 2¢ per kw.-hr. rate. Others in proportion.

NOW YOU CAN heat treat, harden and temper small parts in your own plant . . . without experienced heat treaters. Economical to install and use, Cooley Electric Furnaces operate efficiently at high or low heats, and save your large furnace time for work requiring large volume capacity. Here are some profitable uses:

PRODUCTION HEAT TREATING of small parts
... Small batches ... Running pilot lots to predetermine mass production techniques ... Emergency repairs ... Industrial and laboratory testing ... Miscellaneous controlled heating jobs.



CHAMBER	8"W 6"H 14"L 18500 F. In 55-65 min. 14.8 at 230 v. 3400				10"W 6"H 18"L			8"W 6"H 14"L 20000 F. in 2½ hrs. 20.2 at 230 v.		
FROM COLD					18500 F. in 55-65 min.					
AMPERES					19.6 at 230 v.					
WATTS					4500				4650	
MODEL*	MH-3	VH-3	MK-3	VK-3	MH-4	VH-4	MK-4	VK-4		VK-5
PRICE	146.00	166.00	186.00	206.00	222.50	242.50	262.50	282.50		340.00

- \* M models complete with hinged door and hearth plate.
  V models have counterweighted vertical lift door with adjustable
- opening.
  K models include Selective Power Modifier for input control to correct temperature lag.

### ACCESSORY EQUIP:

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Good territories open on this extensive line of selfcontained small electric furnaces. Investigate now.

### FREE HEAT TREATING HELP

Our experience in heat-treating is available to you. State your problem . . . write for free literature today no obligation.



### COOLEY ELECTRIC MANUFACTURING CORP.

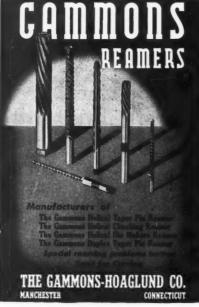
34 South Shelby Street

Indianapolis 7, Indiana

INDIANAPOLIS MACHINERY EXPORT CORP.

Export Manager, 44 Whitehall Street, New York, New York





### Sponge Rubber Pad for Sterling 1000 Portable Electric Sander

The machine sanding of curved surfaces of metal, plastics, and other materials is said to be possible with the Sterling 1000 Portable Electric Sander through the use of sponge rubber pads now being introduced by the Sterling Tool Products



Sterling 1000 Portable Electric Sander Equipped with Sponge Rubber Pad

Co., 363 E. Ohio St., Chicago 11, Ill. With the flexible pad, convex and concave surfaces may be sanded easily and uniformly.

The pad is faced with a 1-inch thickness of an oil-resistant cellular type sponge rubber. The abrasive sheet is placed over the flexible surface of the pad in the same manner as with the standard sanding pad of the tool. The sponge rubber pad is designed to fit all Sterling 1000 Portable Electric Sanders now in use and accommodates a 3 2/3 x 10½-inch abrasive paper.

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June

## MELAT SURIS



with the New DI-ACRO BRAKE

- ROK-LOK—new sensitive material clamp increases accuracy
- DOUBLE-EDGED FORMING BLADE allows close reverse bends
- NEW PRECISION STOPS accurately control angularity of bends

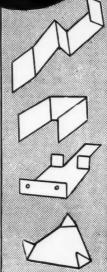
This versatile metal forming machine was developed for use in model shops, experimental laboratories and production departments where it often replaces dies for all types of precision forming operations. Di-Acro Brakes will form a great variety of materials including copper, bronze, stainless steel, aluminum and bi-metals.

WRITE FOR CATALOG. New edition of 40-page Di-Acro Catalog contains detailed information on all Di-Acro Brakes, Shears, and Benders and illustrates how these precision machines can be used individual-

ly or cooperatively for "DIE-LESS DUPLICATING".

← DI-ACRO is Pronounced "Die-Ack-Ro"

306 8TH AVE., LAKE CITY, MINNESOTA



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### Herman All-Granite Bench Plate

The Herman Stone Co., 324 Harries Bldg., Dayton 2, Ohio, announces the addition to its line of surface plates of a solid all-granite bench plate measuring 12 x 18 inches.

Made of the same material as the standard line of Herman Stone plates, the bench plate is said to be accurate up to 0.00005 inch, long-lasting, non-abra-

sive, non-magnetic, temperature—resistant, rustproof, and corrosion-proof. It is a straightsided type and is claimed to be easy to handle.

### G. & L. Vertical Plastics Injection Press

Vertical construction incorporating the use of a single hydraulic cylinder character-

izes the G. & L. Vertical Plastics Injection Press illustrated herewith, product of the Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. The construction provides for clamping the mold halves together and injecting the plastic material into the mold cavity in the same stroke of the piston rod.

The piston is hydraulically powered by a self-contained hydraulic unit which

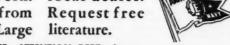


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# Instruments for CRITERION Boxing HEADS

Where high precision is required Criterion Boring Heads are of value. Made by precision methods, they are obviously perfect for precision work. Lead Screw is ground from solid AFTER hardening. Large

graduated dial... Criterion Heads are sold from coast to coast. Order from your local dealer.



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### CUSHION CONE HIGH SPEED TAPPER



Bronze and Ball
Bearings
Throughout
for High Speed
Tapping of
Small Holes
2:1 Reverse.
Taps to 3/16"
in Steel and
1/4" in
Cast Iron.
Send for Bulletin

ERRINGTON MECHANICAL LAB.

Main Office and Works:

STATEN ISLAND 4, NEW YORK

forms an integral part of the machine. When the cylinder is activated, the piston rod movement operates a toggle mechanism. This initial downward movement of the piston rod locks the die plates together. As the piston rod continues its downward movement, it also serves as a plunger to inject thermoplastic material into the mold.



G. & L. Vertical Plastics Injection Press

According to the manufacturer, the vertical construction of the G. & L. Injection Press eliminates the need for elaborate insert holding devices, thus not only simplifying insert molding, but also preventing possible mold damage since inserts are held in position by gravity and do not slip or fall. Moreover, the design of the press provides for simplified quick changing of heating cylinders for different plastic materials and colors. Additional structural features of the machine include simplicity of handling molds, no overhead cranes being needed. All units of the press are easily accessible. Simple removal of two covers presents all electrical, hydraulic, and mechanical devices for servicing.

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# BAY STATE BAY STATE WAPS & DIES



The Home of Bay State is designed for manufacturing Taps and Dies of Precision Performance  $\cdot$ 

\* \* \*

Standard Quality makes them a Quality Standard.

On nearby shelves of Industrial Supply Distributors.

BAY STATE TAP & DIE CO.

MANSFIELD, MASSACHUSETTS



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### "Palmgren" No. 410 Milling Machine Vise

Equipped with a swivel base to afford quick, accurate setupsatany radius within 360 deg., a compact milling machine vise of low construction, designated as the



"Palmgren" No. 410 Milling Machine Vise

"Palmgren" No. 410, is announced by The Chicago Tool and Engineering Co., 8384 S. Chicago Ave., Chicago 17, Ill. Designed to resist tool pressure and vibration and to reduce set-up time to a minimum, the vise includes jaws made of steel, one jaw being grooved horizontally and vertically for holding round pieces. The

swivel base is accurately graduated a full 360 deg. and once set is said to lock firmly in position.

Especially useful in performing milling, grinding, cutting, and other machine operations where precision work is essential, the Palmgren No. 410 Milling Machine Vise is made with 4-inch jaws which can be opened a full 4 inches and have a depth of 1% inches. The vise measures 4% inches high overall and weighs 21 pounds.

### Reypo Quick-Acting Vise

Featuring an accurately machined dovetail slide with adjustable gibs to prevent wobble, a quick-acting vise constructed of high grade materials is announced by the Reypo Corp., 9900 Lincoln Blvd., Los Angeles 45, Calif. The rear jaws of the unit can be set in two positions, and both jaws are equipped with removable inserts. Soft metal or plastic inserts may be used.

The Reypo Quick-Acting Vise can be readily adjusted to the work by pushing the barrel and screw assembly until the jaws contact the work. A partial turn of the screw then holds the work firmly in



Send us your old drills—we'll make them new again at a fraction of the cost of a new drill! Exclusive NU-TANG\* process replaces twisted or broken tangs with brand new tangs of correct size—and with GUARANTEED ORIGINAL STRENGTH. No welding—No distortion—No shortening of drills—No sleeves.

Any drill, reamer, or other tool with a Morse taper in sizes 2 to 6 can be repaired perfectly this quick new way. Delivery—One week. Used by many leading industrial plants. Amazingly low cost—satisfaction guaranteed! Send for complete information.

\*Patent Pending.

NU-TANGS INC. 1337 Bates Street Cincinnati 25, Ohio

June

# Star Performance BATH TAPS

A THILITIES

The "BATH" imprint on the shank of your tap is more than a trademark. It's your guarantee of tap perfection. It's your guide to taps that are hardened, tempered, toughened and then ground from the solid.

It's your "buy word" for taps.

TAPS AND THREAD GAGES

John Bath & Company, Inc.

WORCESTER

MASS.

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Reypo Quick-Acting Vise with Accessories

place. To release the work, the screw is given a half turn so as to reduce pressure and the lock lever is flipped so as to permit the jaws to be withdrawn. The handle is provided with a spring detent.

The Reypo Quick-Acting Vise has an overall height of 2 inches, jaw width of 1½ inches, and maximum jaw opening of 1½ inches. Accessories available include a small hand vise with ½-inch jaw opening, vise handle, and swivel base.

### Amico Model 400 Polishing and Buffing Lathe

Designated as the Amico Model 400, a polishing and buffing lathe for jewelers, plastic manufacturers, platers, foundries, toolrooms, and laboratories is now being introduced by Ralph Hochman & Co., Newark, N. J. The machine is equipped with a self-contained dust collecting system and is available with a ball bearing 1,725 r.p.m. motor of various sizes from ½ to 3 h.p. of standard current characteristics. The motor is arranged to operate both the polishing head and the dust collecting system by means of A-type link belting.

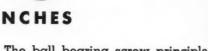
The polishing head and cover tray are of cast aluminum and are provided with two sets of standard ball bearings on which the spindle shaft revolves. Dust is drawn from the surface of the machine by a 4-inch duct in each individual collector. A removable receptacle on the intake side of the exhaust fan is said to trap any foreign object and prevent it from being drawn into the system. The dust-laden air is cleansed by being passed through water and is returned to the workroom through three louvers located in each side of the dust collecting system.

### WHITNEY- JENSEN PRODUCTS

Nos. 10 - 11 - 12

### BALL BEARING PUNCHES

Capacity-3/8" thru 1/4"



The ball bearing screw principle gives tremendous punching power in a light-weight tool.



### No. 24 BALL BEARING PUNCH

Capacity—½" thru %"
Depth of Throat—3½"

Weight—50 lbs. Height of Throat—4"

Write for Catalog WHITNEY METAL TOOL COMPANY

# Do You Know... users report AMERICAN SWISS

Swiss-pattern files save as much

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as 30% of filing costs on intricate

or accurate filing jobs.

Tool and die makers and machinists do faster, better filing with these precision tools because of their clean, sharp, accurately cut teeth, their long filing surface, their uniform hardness, and the wide range of selection that assures the right file for every job.

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MODERN MACHINE SHOP

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### **ARTUS PLASTIC SHIM**



FEELER GAUGE STOCK

The COLOR tells the THICKNESS

Each thickness a distinctive, easy to identify color. Impervious to oil. Long lasting. 5"x20" sheets. Special sizes to order. Handy assortment, shim stock, 12 colors—12 thicknesses (.001-.030). Bound together. \$4.25.

Order today. Immediate delivery.

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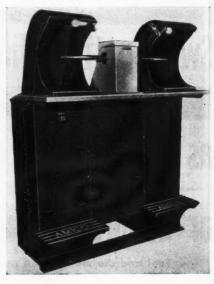
GEO. T. SCHMIDT, INC.

1806 W. BELLE PLAINE AVE.
CHICAGO • 13 • ILLINOIS

Depth

The spindle, which consists of turned, ground, and polished steel, is tapered but can be readily replaced with a straight-type spindle if desired. Each wheel has its own dust collector. Dust is collected in a fabric bag which is immersed in water on the exhaust end of the fan housing. The dust bag can be readily removed for cleaning.

To reduce eye fatigue, the working table top of the Amico Model 400 is cov-



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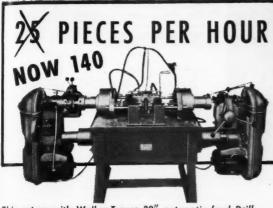
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Amico Model 400 Polishing and Buffing Lathe

ered with linoleum, and the machine is finished on the exterior with green and cream paint. The construction of the unit provides two foot rests and ample room for two operators, as well as a brilliant non-straining light in each of the wheel hoods. The machine can be used as a grinder as well as a polishing lathe.

Champion Light-Duty C-Clamp

Featuring a special aluminum alloy body, a light-duty C-clamp which is designed to provide for maximum strength at the points of greatest stress has been added to the line of Champion products marketed by The Western Tool & Manufacturing Co., Inc., Springfield, Ohio. The steel screw of the clamp is precision cut



20"
POWER FEED
WALKER-TURNER
Drill
Heads

This set-up with Walker-Turner 20" automatic feed Drill Heads drills nine holes from two sides, in one automatic push-button cycle.

The Du-Fold Mop Manufacturing Company of Cleveland recently increased the production of metal mop heads by nearly 500% by using two Walker-Turner Drill Presses in a special set-up with Zagar gearless drill heads.

One head drills five and the other four holes at opposite ends. The work locates automatically. A push button starts the complete cycle including retraction of heads.



20" Power Feed Drill Press Head. Five standard spindle speeds, 400 to 2600 r.p.m. with 1740 r.p.m. motor. Capacity 1" in cast iron, 34" steel.
\*Price less motor \$216.00

### "VERY DIFFICULT PROBLEM SOLVED," says Dufold

"It has really solved a very difficult drilling problem for us and we will be placing another order shortly," is the comment on this Walker-Turner job.

We used your 20" power feed drill presses in the manufacture of 40 mm. tracer shots during the war and we were so well satisfied with them that we did not consider any other make.

The wide range of speeds and the 10 spline spindle with no play and low investment cost are other reasons why Walker-Turner drill presses were chosen for this set up.



\*F.O.B. Plainfield—slightly higher west of the Rockies and in Canada SOLD ONLY BY AUTHORIZED INDUSTRIAL MACHINERY DISTRIBUTORS

### MACHINE TOOLS

DRILL PRESSES - HAND AND POWER FEED . RADIAL DRILLS . RADIAL SAWS METAL-CUTTING BAND SAWS . POLISHING LATHES . FLEXIBLE SHAFT MACHINES RADIAL CUT OFF MACHINES FOR METAL . MOTORS . BELT & DISC SUPFACERS

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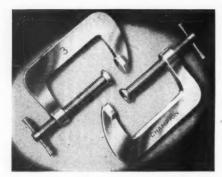
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Champion Light-Duty C-Clamps

for accuracy and long wearing qualities, and bearing surfaces are precisely machined. The design also includes a sliding cross handle and heavy button tip for applying maximum holding pressure.

The Champion Light-Duty C-Clamp is said to be ideal for light production assembly operations, general machine shop work, or miscellaneous clamping jobs in

foundry core rooms, welding shops, and so on. The clamp is available in five sizes having openings of  $2\frac{1}{2}$ , 3, 4, 5, and 6 inches and depths of  $1\frac{3}{4}$ ,  $1\frac{7}{8}$ , 2,  $2\frac{1}{2}$ , and  $2\frac{3}{4}$  inches respectively.

### Square D Class 9007 Type AW Limit Switch

Featuring an oil-tight enclosure suitable for machine tool applications, a limit switch designated as the Class 9007 Type AW is announced by the Square D Co., Industrial Controller Div., 4041 N. Richards St., Milwaukee 12, Wis. The switch is described as having a high electrical rating, long mechanical life, and minimum size as a result of the use of a small but sturdy self-contained contact mechanism mounted in a gasketed die-cast enclosure. Both surface and flush-mounting arrangements are available and the switch can be obtained with either a roller arm or push-rod operated mechanism. The push-rod mechanism is designed for straight-line operation and is not recommended for side thrusts.

The die-cast enclosure with Corporene

### "CONE-LOK" JIGS

- MECHANICAL SIMPLICITY
  - ADAPTABILITY
- RUGGED CONSTRUCTION
  - . CHIP PROTECTION
  - · SEALED LUBRICANT
  - . MAXIMUM SAFETY



The Woodworth "CONE-LOK" jig utilizes the full braking power of its perfectly mated male and female cones.

ACCURACY
YOU CAN TRUST

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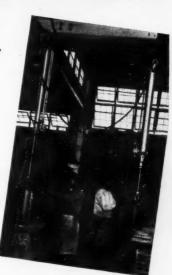
For Lifting, Pushing or Pulling with

## **CURTIS** Air Hoists

Check these advantages:

- √ Low first cost, lowest operating expense
- √ Smooth, fast, accurate control
- √ Finger-tip control
- √ Light weight, immune to overloading
- √ Capacities up to 10 tons

For full information on Curtis Air Hoists, Air Cylinders and Air Compressors, write for Form C-7.



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of Curtis Manufacturing Company

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93 Nears of Successful Manufacturing

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Square D Class 9007 Type AW Limit Switch

gasket is said to be oil and dust-tight and suitable for mounting in several positions. The ½-inch conduit entrance can be made available at either end of the box by rotating the cover and switch assembly 180 degrees. The roller arm type switch requires only 5 deg. of travel for operation and is provided with as much as 25 deg. overtravel in either direction. It can be adjusted to any position around a complete circle. The return spring can be easily reversed for either clockwise or counterclockwise motion of the lever or completely removed for maintained contact action. The operating arm is available in various lengths from % to 3 inches with standard hardened steel rollers % inch in diameter x ¼ inch wide. Special rollers for one-way operation and other unusual applications can also be furnished.

### Chisholm-Moore "Cyclone" Model M Hoist

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A high speed hand-operated hoist that is claimed to be 96 per cent mechanically efficient, designated as the "Cyclone" Model M, is announced by the Chisholm-Moore Hoist Corp., Tonawanda, N. Y. Through the use of steel and aluminum alloys, the weight of the hoist has been held to a minimum, thus making it easy and safe to handle and install, it is

## LAPPING and GRINDING COMPOUNDS

GRADE 17 (Medium) GRADE 18 (Medium Fine) GRADE 19 (Fine)

SPECIAL COMPOUNDS FOR BRASS AND BRONZE

### PLUG COCK VALVES

These three grades of compounds have a special water soluble base that possesses excellent lubricating qualities for grinding various styles of plug and key cock valves. These compounds do not "niggard or score" while grinding—a common trouble with most compounds. They contain abrasives of the proper grit size for grinding or lapping-in brass and bronze plug valves. The finished parts can be washed with ordinary water.

Generous samples sent upon request



courtesy Hays Mfg. Co.

UNITED STATES PRODUCTS CO.

518 MELWOOD ST.

PITTSBURGH, PA.

About About Rore Dies

SIMPLE CONSTRUCTION . EASY TO OPERATE . FACTORY TESTED

To understand the operation of the "Acorn" Die, one should see it in relation to the "Acorn" Die Holder as pictured at the right in sectional view. The feature which makes the "Acorn" Die so convenient and accurate is the manner in which the four prongs or threadedlands are compressed when the holder cap is screwed down onto the holder. As all bearing surfaces on the holder and die are ground to insure correct alignment and accuracy, even pressure is brought to bear on each of the prongs simultaneously so that they all adjust equally and concentrically. This is done quickly and automatically by tightening the cap and turning up the lock nut. No other adjustments are necessary.

A positive adjustment to size can be obtained by using the threaded-

A positive adjustment to size can be obtained by using the threadedplug which comes with every "Acorn" Die. This plug has actually been threaded by the die in which it is shipped and has been carefully checked for accuracy. Thus, if it is used as a setting plug, accuracy of the set up will be assured. For close to shoulder work, quick change over of jobs, accurate threads,

specify "Acorn" Dies to your local Greenfield Distributor.

### HOLDERS ADAPT "ACORN" DIES FOR ANY MACHINE



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### REGULAR

Regular "Acorn" Die Holder with longitudinal float which allows the die to follow its own lead independent of any lag in the machine. This holder may be used on practically all automatic screw machines and any other machines which provide for automatically reversing the die or rod at the instant when the desired length of thread has been cut.



### RELEASING

Releasing "Acorn" Die Holder, while suitable for all machines, is especially recommended for hand operated machines. The improved clutch mechanism allows the holder to be released without shock.



### ADAPTER

The "Acorn" Die Adapter permits the use of "Acorn" Dies with existing round die holders. It consists of three parts, a Cap to hold and adjust the die, a Lock-Nut to secure the adjustment and a Body. The shank fits round or spring die holders of corresponding size.



ASK YOUR "GREENFIELD"
DISTRIBUTOR FOR
12 PAGE "ACORN" DIE BOOKLET!

GREENFIELD

F and DIE CORPORATION - Greenfield - Massachusetts and its New Neven Division The GEOMETRIC TOOL COMPANY





● PARKER VISES have the oversize ruggedness built-in to stand up under hard use over a long service life. To make this power productive, they are accurately machined and assembled—combining features that speed up work and cut production costs. Specify Parkers next time from your distributor. The Charles Parker Co., Meriden, Conn.

### FEATURES

Tool steel jaws -- renewable.

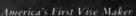
Solid cast underportion-no slack.

Oversize steel screw and malleable iron nut.

Tension spring handle.

Swivel base, 360° swing, positive auto-type lock.

PARKER VISES 🔘





claimed. In addition, the hoist is compactly constructed and incorporates a minimum number of component parts. All rotating parts are equipped with precision ball bearings having double sealedin lifetime lubrication.

According to the manufacturer, the construction of the Cyclone Model M Hoist is such that an unusually light pull



Chisholm-Moore "Cyclone" Model M Hoist

is sufficient to unlock the brake and lower the load. At the same time, the lowering load is said to be under absolute control of the operator, thus enabling it to be easily and accurately spotted where desired. The hoist is available in four standard capacities of ½, ½, 1, and 2 tons. All models are equipped with "Herc-Alloy" steel chain.

### MB "Isomode" Pad

Known as the "Isomode," a pad for use under all types of machinery as a mounting pad or vibration absorber is announced by The MB Manufacturing Co., Inc., New Haven, Conn. The pad is made of live, oil-resistant Neoprene, and is de-

Use Blades 19 Like These?



### TIP THEM WITH COLMONOY

The Cost—You can get a solid Colmonoy tip, \(\frac{1}{4}\)" x \(\frac{1}{2}\)" x 3", with the angle cast right in, for only \$1.02. A small amount of silver solder and a few minutes time applies it to your rest.

The Advantage—You'll find, as others have, that it will outwear high speed steel by 10 times. And it won't break, like similar hard materials.

The road to lower centerless grinder blade costs is paved with Colmonoy.

Write—for full information and the name of your nearest jobber.

WALL COLMONOY CORPORATION

7TH FLOOR FISHER BLDG., DETROIT 2, MICH.

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MB "Isomode" Pad

signed and compounded to ensure ruggedness, high efficiency, and long life.

According to the manufacturer, the MB Isomode Pad is effective for all types and sizes of equipment, from typewriters to forging hammers. The pad has a standard size of 18 inches square x for inch thick but can be easily cut to any size or shape desired. Used as a mounting pad or machinery base, the Isomode Pad reduces the time required for installing or moving machinery by eliminating the need for hold-down bolts, skids, concrete mats, or grouting.

Self-adjusting, the pad, it is stated,

readily compensates for variations in floor surfaces and absorbs all frame and foundation stresses present during the operation of rigidly attached machines.

Ames "Trutest", Indicator

Automatic reversible action that is claimed to eliminate the tripping of a latch in changing from "over" to "under" work is a unique feature of a universal indicator, known as the "Trutest," now being manufactured by the B. C. Ames Co., Waltham 54, Mass. In addition, the unit is arranged so that the indicator hand always moves in the same (clockwise) direction, whether the top or bottom of the contact point is in use.

The contact finger can be easily swiveled to the desired angle, which is maintained without slippage. The contact itself is attached by screw threads and, therefore, cannot drop out. The dial is  $1_{70}^{\circ}$  inches in diameter to provide for quick and easy reading. The contact points, all staffs, and all pinions are of hardened steel. The pivots are burnished after hardening.

Two clamping or support lugs are cast



Production drilling No. 53 and No. 49 holes Write for Bulletin 201

### **ELECTRO-MECHANO**

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THEN investigate POBCO Self-Lubricating Bearings.

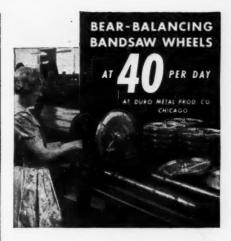
Any size — any shape any load — any speed. Many other essential qualities. A 'must' for certain jobs.

PARAMOUNT OILLESS BEARING CO., INC. WORCESTER 3, MASS.



TYPE HOLDERS AND TYPE ... ROLL MARKERS ...
HAND STAMPS (LOGOTYPES DIES STANDARD
AND SPECIAL STAMPS INSPECTORS STAMPS
MACHINE ENGRAVING PRECISION DUPLICATING

NEW METHOD STEEL STAMPS, Inc. 149 Joseph Campau, Detroit 7, U.S.A.



## Buyers are asking... "IS IT DY-NAMICALLY BALANCED?"

Bear-Static and Dy-namic Balancing of rotating parts makes machines last longer, serve better, sell easier. Buyers are reading ads, looking in catalogs, asking salesmen, about DY-NAMIC Balancing; they want and expect the extra, quiet years of operation Dy-Namic Balancing brings.

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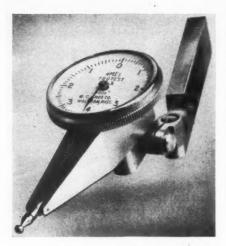
All Bear machines will balance bodies to any recognized standard, QUICKLY. This speed makes Bear-Balancing an inexpensive operation, which fits smoothly into production flow. Any shop hand learns Bear-Balancing in half a day. Write Today for Bulletins. BEAR MFG. CO., Industrial Division, Dept. M-25, Rock Island, Illinois.



BEAR

STATIC AND DY-NAMIC BALANCING MACHINES

2012



Ames "Trutest" Indicator

solid with bronze casing, the lugs being designed to accommodate beryllium copper clamps for rigidly supporting the indicator. The design of the indicator also includes a patented bezel wire, dial, and unbreakable crystal construction which provides for maximum protection, yet permits easy removal. All parts of the unit are chrome plated.

The Ames Trutest Indicator is furnished with two contacts of 0.100 and 0.031-inch diameters, as well as with two support bars, one being ¼-inch wide for tool post work and the other ½-inch wide for height gage work. The indicator is available in two models of identical outside dimensions; namely, No. 1, reading in 0.0005 inch with 0-15-0 dial, and No. 2, reading in 0.0001 inch with 0-4-0 dial. The contacts are interchangeable in the two models. The indicator is supplied packed in a handy plastic box which provides a convenient and safe storage means for the instrument when not in use.

#### Keller Sizes 12A-1 and 12A-1C Screw Drivers

Especially designed for the fast driving of small screws, a pneumatic screw driver is now being offered in two sizes designated as the 12A-1 and 12A-1C by the Keller Tool Co., Grand Haven, Mich.





Forthman Scrapers are tipped with super-hard CARBOLOY CEMENTED CARBIDE to resist wear and hold keen cutting edge over longer periods of continuous use! In terms of user benefits, this means

. . . longer scraper life!

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- ... fewer interruptions for resharpening!
- . . . finer finishes faster!

Furnished ground or unground. Write today for prices and specifications. Manufactured by

CLIFE J. FORTHMAN 633 Elkton Place • Cincinnati 24, Ohio



This model has been engineered for applications where a small rugged tool can be used advantageously. Steel body for Safety. Special grease-sealed bearings requiring no automatic or manual lubrication. Compound rotors develop an abundance of power. Extremely lightweight, 12 oz. Whole length 5½", Length of body 3". Accommodates mounted grinding wheels, rotary files, etc., on ½" dia. shanks. Prompt deliveries.

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#### STANDARD SIZES

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#### WE MANUFACTURE ALL TYPES OF STEEL BOXES

We make a specialty of boxes made to fit your particular handling requirements. Special boxes designed so they can be run thru with standards enable us to quote prices comparable with that of a standard box.

FACTORY EQUIPMENT CO

183 CHARLES ST. PROVIDENCE, R. L.

#### **LUMA Soldering Tool**



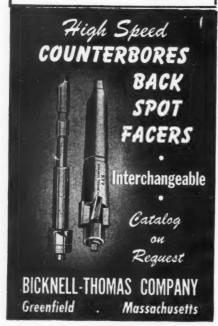
RESISTANCE TYPE

The tool of a hundred uses. For all soldering jobs large or small. No warming-up time required—heats instantly. Low maintenance. Safe and easy to operate. Write for details.

LUMA ELECTRIC EQUIPMENT CO.

P. O. Box 132-M.S.

Toledo 1, Ohio



The tool is claimed to be particularly useful in the assembly of radio parts, electrical appliances, alarm clocks, telephones, plastics products, and novelties.

The Size 12A-1 has a free speed of 2,500

r.p.m. and is designed for delicate screw driving operations. It can be used to drive free-running machine screws up to size No. 3 and very small self-tapping

and wood screws.

The size 12A-1C has a free speed of 10,000 r.p.m. and is designed to accommodate screws in the No. 3 to No. 6 range. The impacting force of a built-in clutch is said to afford this model added drive, the tool being recommended for wood screws, and larger machine screws.

Outstanding features of the Keller Sizes 12A-1 and 12A-1C Screw Drivers include pneumatic pickups which enable the operators to pick up screws with the air suction finders and drive them directly into the work. The screw drivers are constructed to



Keller Pneumatic Screw Driver for Small Screws

fit the palm of the hand or between finger tips when screws are driven in a vertical position. Each tool weighs 8 oz. and is 5½ inches long. The outside diameter of the housing of each screw driver is 1½ inches. Bits and finders to fit screws from No. 0 through No. 6 are available.

Carboloy Boring Tools

A comprehensive line of seven basic styles of standardized carbide-tipped boring tools in from four to six sizes each is announced by the Carboloy Co., Inc., 11143 E. Eight Mile St., Detroit 32, Mich. Five of the styles represent additions to the previous standard stock line of round shank square end tools.

The five new styles comprise two types of round shank tools for use in 30, and 45-deg. boring bars, in four sizes each, and three tap types of square shank tools for use in 30, 45, and 90-deg. boring bars, in six sizes each. All styles are available

#### STANDARD STEEL **SPECIALTIES**

#### MACHINE KEYS

We can supply a complete line of finished machine keys including gib head and taper keys, rod keys, round end keys, etc.

#### WOODRUFF KEYS

Complete stock of standard keys on hand for prompt shipment. Made from open hearth or alloy steel.

#### TAPER PINS

Available in sizes 7/0 through 10 and lengths from % inch to 6 inches. Others made to specification.

#### MACHINE RACK

Can furnish rack from almost any size blank and pitch as well as length to form continuous sections.

Write for catalog

#### STANDARD STEEL SPECIALTY COMPANY

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#### DON'T WAIT UNTIL TAPS BREAK OFF - and then wish you had a set of

#### WALTON Tap Extractors



#### THE WALTON COMPANY

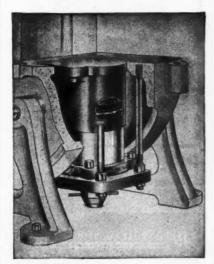
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Easily.

OFFER.

Hartford, Conn.



#### Die Cushions

#### **Every Punch Press** Requirement

For deep drawing operations. For pressure pad control on form dies.

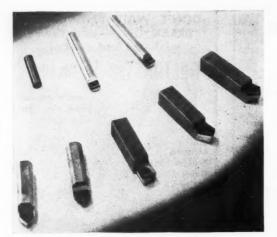
For stripping blanks and ejecting slugs.

> Write for Engineering Catalog No. 100-12.

#### DAYTON ROGERS MANUFACTURING CO.

Minneapolis 7.

Minnesota



in grades for both steel cutting and boring cast iron and other materials.

All of the new style tools have a primary clearance of 7 deg. and a secondary clearance of 10 deg. All types and sizes are furnished ground with a nose radius. The diameters of the new round shank tools range from 1/8 to 1/2 inch. These tools are available with tips of two grades of Carbolov cemented carbide, Grade 883 and Grade 831, the latter for precision boring of steel and the former for the boring of cast iron, non-ferrous and non-metallic materials.

Square shank boring tools are available in shank sizes ranging from  $\frac{1}{15}$  to  $\frac{3}{4}$  inch. Sizes up to  $\frac{1}{2}$  inch are available in both the 883 and 831 grades, while the two larger sizes are available with 883 and Grade 73 tips. The 78 grade is a steel-cutting grade, designed for finishing and light roughing cuts.

The square end round shank boring tools are available, as formerly, in shank diameters ranging from  $\frac{7}{10}$  to  $\frac{1}{10}$  inch. In addition, the company has available round blanks for solid Carboloy boring tools ranging from  $\frac{2}{10}$  to  $\frac{1}{10}$  inch outside diameter.

Now IN STOCK in





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Kilbourn Avenue, Chicago

#### GEM MACHINE VISES

For TOOL-ROOM or Production.



Six sizes, 3" to 12". Many exclusive features. You see them everywhere. Write for circular.

J. E. MARTIN MACHINE WORKS

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#### Sauereisen Iron Cement No. 35

A compound in powder form which hardens into iron when mixed with water. No. 35 resets loose screws, bolts, repairs cracks in iron and steel castings, pipes and engine blocks.

Order a Trial Gallon at \$4.55

Sauereisen Cements Company 47 Sharpsburg St., Pittsburgh 15, Pa.



Complete with motor . . . 4" four-jaw universal machine tool chuck and foot control switch. Capacity from ¼" to 1½" reamers. Four speeds . . . 30—45—72 and 115 RPM. Higher speed ranges available. Eliminates handwork. Speeds production. Mail your order today. The new Greaves streamlined reamer-driver will come your way—prontol



#### DIE CUT PARTS AT LOW PRICES

Quick Delivery



#### **Our Specialty:**

Short run stampings, one piece to 30,000: for small production runs-for experimental model work.

Small, irregular shaped parts stamped, formed, pierced, extruded or tapped to your specifications.

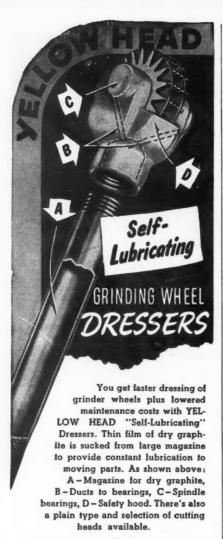
We use quick-process temporary or semi-permanent dies.

Send us your prints for firm quotations and delivery commitments.



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CITY MACHINE CO., DEPT. MM

PIQUA, OHIO

Write



294

for complete details and prices Dayton Rogers Model HP Safety Overload Connecting Link

Designated as the Model HP, a hydraulic safety overload connecting link which may be applied to all punch presses is announced by the Dayton Rogers

Manufacturing Co., 2835 S. 12th St., Minneapolis 7. Minn. Designed to provide the necessary tonnage protection within the maximum tonnage capacity of the punch press, the link is not only said to protect the crank and press frame but can also be arranged so as to protect any of the tools used in the press. In addition, it is constructed to compensate for stock thickness variation or the inserting of two blanks on a forming die on all operations, such as forming, pressing, briquetriveting, ing, assembling, and so on.



Dayton Rogers Model HP Safety Overload Connecting Link

The Safety Overload Connecting Link can be easily

installed on practically any punch press and is built in various sizes for press capacities from 37 to 250 tons.

Wypo Tip Cleaner

Designated as the Wypo, a tip cleaner for use in cleaning oxyacetylene welding and cutting tips has been added to the line of apparatus offered by the Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y. The tip cleaner is available in two individual packages designated as Set No. 1 and Set No. 2. Set No. 1 contains 12 cleaners for drill sizes ranging from Nos. 75 to 49. Set No. 2 contains nine cleaners for drill sizes ranging from Nos. 48 to 30.

Wypo Tip Cleaner is made of corrosionresistant stainless steel, and each cleaner set is furnished in a compact, easy-to-

carry, leather case.



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sheet. No. 2 cuts up to " steel plate.

BREMIL MFG. CO. 1400 Pittsburgh Ave. Erie, Pa.

#### ADVANCE CLAMPS Cut Set-Up Time 75% on

#### **JIGBORERS**

THE ONLY T-SLOT CLAMP For use on all machines with T-slots. Manufactured and sold by

#### **ADVANCE MACHINE WORKS**

FORT WAYNE 7, INDIANA





Matco Angle Plate

A universal angle plate for use in performing drilling, grinding, gaging, and tool and die work has been developed by



Matco Angle Plate

the Matco Tool Co., 2830 W. Lake St., Chicago 12, Ill. The angle plate can also be employed in dressing angles on grinding wheels by the use of a diamond holder slid along the ways of the top plate.

CARROLL
AND
JAMIESON
LATHES
15" AND 16"

Modern Design—
Liberal
Dimensions.

Write
for
Bulletin.

THE CARROLL & JAMIESON
MACHINE TOOL CO.

Said to be highly efficient for the production line and inspection department, as well as 'the toolroom, the Matco Angle Plate measures 3% inches high and has a 3½ x 4½-inch plate surmounting the sturdy swivel base. Worm gears are used for close adjusting elevations.

#### Westinghouse SW-2 Electrode

For the rapid and economical welding of mild steel in all positions and with alternating current or either polarity direct current (straight preferably), the Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa., announces an electrode which is available in four diameters from  $\frac{7}{16}$  to  $\frac{7}{16}$  inch.

Designated as the SW-2, the electrode is said to produce welds which meet the requirements of AWS-ASTM specifications for classifications E-6012 and E-6013 and to have the desirable characteristics in respect to flat contours, side wall wash-up, freedom from undercutting, and extreme ease of slag removal that are obtained with Westinghouse DH electrodes (AWS-ASTM classification E-6020 for flat and horizontal work).

#### Mfg. of Precision

#### BROACHES

Standard keyway broaches in stock.

We make a specialty of sharpening, reconditioning and converting broaching tools.

#### PROMPT SERVICE

Our technical staff represents 45 years of broach experience.

#### CONANT TOOL & ENGINEERING CO.

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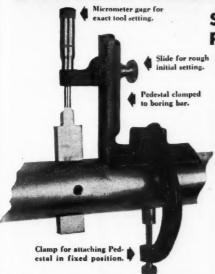
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#### BARTELT GAGES SAVE TIME



## SHORTEN SET-UPS WITH PEDESTAL MICROMETER

Model "AM" Bartelt Pedestal Micrometer (shown) is designed for setting tools in boring bars. Conventional cutand-try method is unnecessary as tool can be brought to exact position in only one setting. Speed and accuracy of adjustment reduces set-up time and helps importantly to increase production. Bartelt gages, available in six models, are valuable and practical shop equipment for tool adjusting, work positioning, inspection, checking, and many other gaging operations. Write for descriptive circulars today, showing eight models now available for various kinds of work.

#### BARTELT ENGINEERING CO.

1214 Partridge Ave.

BELOIT WISCONSIN

## M.R.E. PROFILE TURNING BOX

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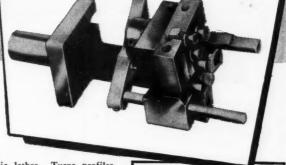
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Saves Up To 80% Machining Time!

Model "A" 9/16" Bar Capacity



Use it on capstan and automatic lathes. Turns profiles, multi-diameters and tapers at one pass. Available in three sizes—\(\tilde{\ell}\_{\ell}^{\ell}'', 1"\) and \(1\frac{1}{\ell}''\) bar capacity. Widely used during war by such famous English firms as Hawker Aircraft, Rolls Royce, Vickers Armstrong, etc. Inquiries invited from qualified dealers and sales agents.

Mid. by Manchester Repetition Engineers, Ltd., Manchester, England Write to us today for information. Address Dept. MM-6.

Made at one pass of the M.R.E. Turning Box. Machined in 50 secs. from high speed stock with standard TC tool bit.

ACCREYLON COMPANY, INC. 130 West 42nd St., New York 18, N. Y.

Sole U. S. Agent

#### Why THOR STAMPS Last Longer



... because they're made of a special, correctly - heated alloy steel. Central striking point assures uniform marking. Thumb side marking assures easy use.

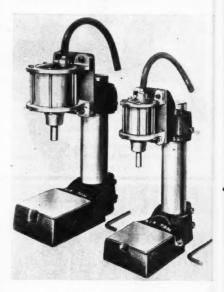
You get more mark per dollar with THOR STAMPS. Write for catalog and prices.

The Pittsburgh Stamp Co., Inc.



#### Air-Trol Air Arbor Press

To supplement its line of fast-action spring return air cylinders for the application of air power to material holding operations, Air-Trol, 2653 W. Lake St., Chicago 12, Ill., is now offering an air arbor press in two models; namely, a heavy duty model weighing 72 lb. which is designed to deliver well over a \( \frac{3}{2} \)-ton squeeze at 150 lb. line pressure, and a smaller model weighing 40 lb. which is capable of delivering approximately \( \frac{1}{2} \) ton at 150 lb. line pressure.



Air-Trol Air Arbor Presses

When applied to arbor or kick type press operations, the unit can be set by regulating the air line pressure to afford uniform pressure on each application, thus eliminating danger of crushing the work or of incurring variable pressures due to unregulated manual control, it is claimed. When operated with a foot valve control, either model of the press is said to deliver a full stroke with less than 1 inch of foot movement, thereby reducing operator fatigue to a minimum and at the same time allowing the operator free use of both hands for work handling. The cylinder bracket on each model is fully adjustable on the column to provide a working range, or ram clearance, of 0 to 6 inches over the table.

#### QUICK and ACCURATE



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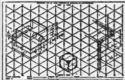
No. 35 FLYNN MICROMETER

OFFSET BORING HEAD HAS RIGIDITY PLUS A Large Range

2" OFFSET 3/4" bar or tool capacity. Bores 1/2" to 12" dia. holes. Write for catalog.

FLYNN MANUFACTURING CO. 437 Bates St. Detroit, Mich.

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EASY TO MAKE AND READ!

One trial will make you another steady user of WADE'S ISOME-TRIC blue lined paper. Shows all surfaces and interior to scale.

Makes clear blueprints. Saves time daily in hundreds of plants. Write for Circular.

Wade Instrument Co. 1422 E. 109th St., Dept. H, Clevel'd, O.





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**AUTO MOULDING** & MFG. CO.

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#### DEPENDABLE MEASURING & CHECKING EQUIPMENT



SLOTTED ANGLES in 19 sixes, ranging from 4 x 9 x 5 and up.

BOX PARALLELS in 15 sixes, ranging from 3 x 4 x 12 and up.

UNIVERSAL ANGLES In 10 sizes, ranging from  $4 \times 3\frac{3}{4} \times 5$  and up.







Over 50 sizes, ranging from 7 x 71/2 to 96 x 192.



Ready for Delivery





STRAIGHT and OFFSET TYPE HAND WHEELS









STANDARD CAST IRON HAND KNOBS

SOLID







MACHINE HANDLES Send for Complete Catalog

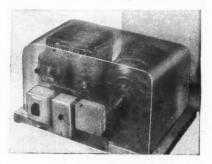
PRODUCTS CORPORATION

6773 E. McNichols Road

Detroit 12, Mich.

#### Reid Phase Converter

Designed to provide standard voltages in sections where only 110 volts, single phase current is available, the Reid



Reid Phase Converter

Phase Converter illustrated herewith, product of the Reid Brothers Co., Inc., Beverly, Mass., is constructed to 220 110 volts, single phase current to 220 volts, 3 phase current, and can be used to drive any machine or machines up to 1½ h.p. capacity.

The converter measures 12 inches high x 22 inches long x 15 inches wide and is completely encased in a sheet steel cover, except for switches. According to the manufacturer, the unit is of rugged construction and is designed to provide for long trouble-free service since there is only one moving part that requires occasional lubrication.

#### "Alsoco" Aluminum Solder

An aluminum solder to be known as "Alsoco" is now being marketed by the Alsoco Corp., 10 E. 52nd St., New York, N. Y. Used to solder aluminum to aluminum without flux or flux substitute, the solder is claimed to have resisted shearing after a 250-hour salt spray corrosion test, even though the aluminum base metal itself broke.

Also featuring unusual electrical and corrosion resistance, Alsoco Aluminum Solder can be quickly and effectively applied without fluxes or any protective methods. Available in three grades designated as M-1001, M-1002, and M-1003, the solder is claimed to have a flow point well below that of aluminum and its commercial alloys.

## WANT REALLY SHARP CORNERS ON THIN GRINDING WHEELS?

"Just Call On Me!"
Says The Metcalf Minute Man

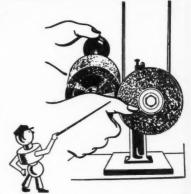
What The Metcalf Wheel Dresser Does:

- \* Brings up sharp corners on thin wheels.
- \* Trues up a square edge.
- \* Turns a bevel rapidly and accurately.

Famous three-fold Metcalf principle:

- \* Cutting effect of one abrasive wheel on another.
- \* Hi-speed, gyroscopic action.
- \* Steadying effect of heavy ball-handles.

Dresser-Wheel replacement costs little—means added savings and greater profits for you. Write today for full details in Bulletin M-67.



FOR LARGE WHEELS WOLVERINE DRESSER, HAND MODEL.



300

HANCHETT MANUFACTURING CO.

A STREET OF STREET OF SWAGES AND SHAPERS WILDING CLAMP





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**ESCO** ENGINEERING CORP.

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APPLY INSTANTLY ON METAL

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- YORK, PENNSYLVANIA -

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**Sub-Presses** Reduce **Hand Finishing** 

> Available in arch and overhanging types in 9 diameters, 10 sizes up to 6". Alignment is

attained for precision and clean work. Lower costs

**Arch Type Press** 

through sav-ings in time and effort.

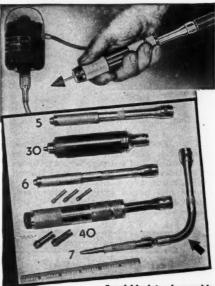
SEND SAMPLES OR DRAWINGS FOR ESTIMATE.

#### **WALTHAM MACHINE WORKS**

Waltham

Massachusetts

#### How to Save Man-Hours in **Deburring and Finishing** of Small Parts FOREDOM SHAFT Machines



5 quickly interchangeable handpiece types—pencil sizes and larger—some with flexible wrist—see arrow

Pencil-size handpieces for the hard-to-reach places. Larger, ball-bearing handpieces for the heavier jobs, all quickly interchangeable. Flexible shafts which really ARE FLEXIBLE. Suspension models as well as bench models.

#### 3 WAYS Right!

For de-burring, grinding, finishing, polishing and other light production jobs—particularly valuable on irregularly shaped

parts.

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3. For touching up set-ups without disassembly, removing high spots on gears, identification marking of equipment, etc.

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direct.

Write for Catalog No. 112

#### FOREDOM ELECTRIC CO.

27 PARK PLACE

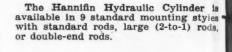
NEW YORK 7, N. Y.

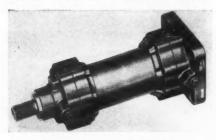
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#### Hannifin 7 and 8-Inch Bore Hydraulic Cylinders

The Hannifin Corp., 1101 S. Kilbourne Ave., Chicago 24, Ill., announces that its standard hydraulic cylinders for service





Hannifin Standard Hydraulic Cylinder

up to 1,500 p.s.i. are now available in two larger bore sizes of 7 and 8 inches. The design and construction of the new bore sizes parallel the standard Hannifin cylinders in 1 to 6-inch sizes and feature bored and honed cylinder bodies, automotive type piston rings, and interchangeable end caps.

#### Westinghouse ACP-MO Electrode

For welding low alloy cast steel or low alloy high tensile strength rolled steels in all positions with alternating current or direct current reverse polarity, the Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa., announces an electrode, designated as the ACP-MO, which is available in four diameters from  $\frac{2}{3}$  to  $\frac{2}{3}$  inch.

Although primarily designed for use with alternating current, the electrode is said to perform unusually well with direct current, reverse polarity. It is recommended for vertical or overhead welding, although equally satisfactory results are claimed to be obtained in making horizontal fillet and flat position welds. Welds made with the electrode are said to meet the requirements of AWS-ASTM tentative specifications for arc welding electrodes classification E-7011.



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#### T. H. LEWTHWAITE MACHINE CO.



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Capacity 7/16" hale through 1/4" steel or equal

Round, squere, flat, and oval shaped punches and dies stocked

Send for circular illustrating and describing this machine.

317 East 47th St., New York 17



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BY A QUICK, EASY, INEXPENSIVE METHOD Your business letterhead will bring literature. WATTS BROS. TOOL WORKS Wilmerding, Pa.

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Lower Production Costs and Provide Greater Ease of Assembly



#### Check These Advantages

- V Eliminate skilled labor in key-seat cutting and key-fitting operations.
- Flat key bottom and starting radius on the edges simplify assembly.
- V Key reaches deep into shaft and is firmly imbedded, enabling it to withstand greater Greater resistance to shaft fracture due to

shape of key seat and permanent key fit. Made in American standard sizes and Whitney standard sizes for special application.

Available from Whitney Distributors throughout the country. Or write:

WHITNEY CHAIN & MFG. CO. HARTFORD 2, CONN.

#### LESS CLEANING TIME

#### MORE PRODUCTION TIME



WITH A

## Doyle VAC-IT

Subtract from cleaning expenses and add to production profits the time you can save by taking advantage of the powerful cleaning capacity of the Doyle Vac-It. Production machinery is thoroughly cleaned and freed of all clogging dust, dirt and grime in a fraction of the time ordinary cleaning methods take. Metal chips, shavings, grease and liquids are quickly removed from working surfaces leaving them clean and dry. So efficiently does the Doyle Vac-It perform that it is not necessary to stop production or shut down machinery during cleaning.

Write today for informative Doyle Bulletins, See how you can cut cleaning time and costs throughout your entire plant.

#### DOYLE VACUUM CLEANER COMPANY

3225 Stevens St., S.W., Grand Rapids 7, Mich.

#### Bradford Model 260 Carbide Tool Grinder

Incorporating a grinding wheel for rough work on the left side and a cup wheel for accurate finish grinding on the right side, a carbide tool grinder designated as the Model 260 is now being manufactured by The Bradford Machine Tool Co., Cincinnati 4, Ohio. The work table is precision machined and is adjustable to the desired angle and height, as well as to compensate for wheel wear.

FIT 270 STANDARD CHUCKS

Pools at
Lower
Cost!
Write ior
Catalog No. A

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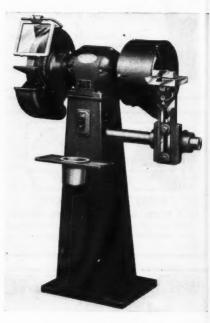
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are precision engineered to flt a total of 270 standard chucks. Immediate shipment from our Cleveland stock. We invite inquiries on your tailored jaw requirements.

Jergens Standard Sott Chuck Jaw Blanks

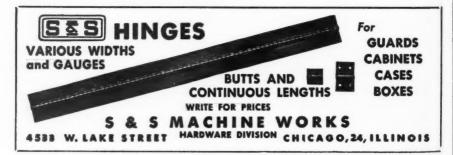
gergens TOOL SPECIALTY CO.

The Bradford Model 260 Carbide Tool Grinder is equipped with an eye shield, tool tray, water pot, and guards with exhaust connections. The slope front con-

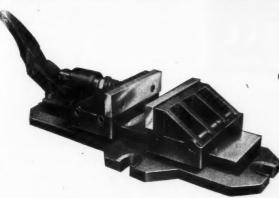


Bradford Model 260 Carbide Tool Grinder

struction of the unit provides for maximum foot clearance. The motor is totally enclosed in accordance with N.E.M.A. specifications and is available for operation on 220-440, 550 volts, 2 or 3-phase 50 or 60-cycle current.



June



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#### SPEED

OF A PRODUCTION FIXTURE IN A

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MILLING VISE

MODEL A-6. JAWS 6" WIDE. ALSO AVAILABLE IN MODEL A-3. \_\_\_Speed Vise= Write For Bulletins.

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#### The New GEARGRIND **Heavy Duty—Constant Velocity** UNIVERSAL JOINT

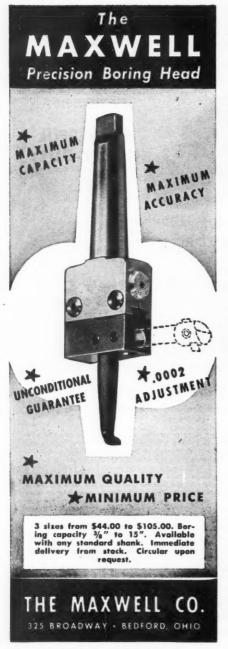
Free From Torsional Vibrations at All Operating Angles and Speeds

• This new high angle, heavy duty propeller shaft universal joint is now in production, after years of severe testing under extreme operating conditions! Enables the engineer to design to meet his particular requirements, because perfectly balanced, compensating joint operating angles are not required as they are with the ordinary cross type joint.

Torque is transmitted through steel balls, positioned in intersecting race ways. A heavy ball socket in the center positions the driving members and maintains true concentricity. The entire joint assembly is completely enclosed, oil being retained by a large tube, pressed on one member and connected to the other by a neoprene diaphragm. Deliveries of certain sizes are now being made. Full Information on request.

**Delivers CONSTANT VELOCITY Over the Entire Range** 





#### Sullivan "Unitair" Compressor

A two-stage air-cooled stationary air compressor to be known as the "Unitair" is announced by the Sullivan Division, Joy Manufacturing Co., Oliver Bldg., Pittsburgh 22, Pa. The compressor is available in nine sizes with power requirements ranging from 15 to 100 h.p. and piston displacements from 81 to 590 cubic feet per minute at 100 lb. displacement presure per square inch, based on 60-cycle motor speeds.

As a result of its compact construction and smooth vibration-free operation, the Unitair is said to require but a small foundation. Said to have a wide application as a compresed-air source for small



Sullivan "Unitair" Compressor

manufacturing plants, in foundries, or for stand-by service, the compressor is available with three standard electric drives, including built-in motor, direct-connected motor, and V-belt drive. The unit may also be equipped for use with gasoline or Diesel engines.

Outstanding features of the Sullivan Unitair Compressor include force-feed lubrication through rifle-drilled oil passages by means of a positive, gear-driven pump; "Cascade" oil cooling to reduce oil consumption and oil sludging; low-lift, large port-area, direct concentric valves for high efficiency; low piston speeds for long life; oversize ball-type main bearings for low maintenance; and four piston rings per piston mounted above the pin for oil economy and for long-lasting, air compression efficiency.

#### Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS



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ed for ey. 747 Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S. Inexpensive - Last for years. Write for Circular.

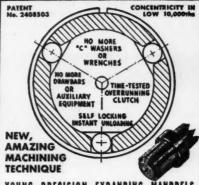
NIELSEN TOOL & DIE COMPANY 1960 W. Eleven Mile Rd. Berkley, Mich.

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All Kinds—Any Quantity AT THE RIGHT PRICE

THE CINCINNATI GEAR CO. Wooster Pike

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#### UNG PRECISION EXPANDING FOR PRODUCTION OR INSPECTION

Curtiss-Wright Corporation ranks our product with their best tools. Cleveland Graphite Bronze Company, leading bearing manufacturer, states new high accuracy reached, plus substantial production boosts.

ROUGHLY SKETCH DESIRED MANDREL INTO YOUR PART PRINT AND FORWARD FOR QUOTES.

YOUNG ARBOR CO. • PH. YE-9784 CLEVELAND HTS. 18, OHIO 3257 BRADFORD RD.,



#### Type LA Tracer for Profilometer

The Physicists Research Co., 321 S. Main St., Ann Arbor, Mich., announces a tracer to be used with the Profilometer



Type LA Tracer for Profilometer

for making micro-inch surface roughness measurements in deep bores such as hydraulic cylinders, camshafts, and tubing. Designated as the Type LA, the tracer is designed to measure to any desired depth in holes as small as ¾ inch I.D. and can be used with any type of Profilometer. The diamond tracing point is self-adjusting to the work surface.

The Type LA Tracer is mechanically operated by means of a Mototrace and Type BA Linkarm. By using Linkarms of the proper length for each application, measurements can be made with a single tracer at depths to 36 inches or greater.

#### **Brayco-124 Rust Preventive**

Machined parts, machinery, and automotive equipment are said to be kept rust-free for up to a year outdoors and 2 to 5 years indoors by means of a grease type rust preventive now being produced by the U. B. Bray Co., 3344 E. Medford St., Los Angeles 33, Calif. Known as Brayco-124, the rust preventive is designed to resist temperatures up to 130 deg. F. Age gradually hardens the film which, however, is always soft enough to be removed by wiping or to flux with regular lubricant.

Brayco-124 can be applied with a brush or swab at room temperature or by the hot dip method when heated to 150 deg. F. A solvent solution of the material, designated as Brayco-124-70, is available for cold application by the brush, spray,

or dip method.

## **Rod Grinding**

#### STRAIGHT RODS

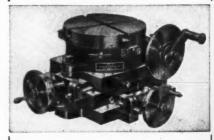
1/32" to 1/2" Diameter Diam. Tol. .0005" on Rods Up to 6' Long. Diam. Tol. .001" on Rods Up to 12' Long.

> Quick Delivery High Quality

14 YEARS OF COMPLETE CENTERLESS SERVICE

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GRINDING CO.
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## No. 1 COMPOUND TABLE With 71/2" Dial Type Rotary Table Mounted



We also make a No. 2 Size for 12"
Rotary Table. Can be had without
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Rotary Tables • Multiple Spindle Index
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Instant .001" adjustment #1900 Micrometer Stop limits depth of Co-sinks and Co-bores. Assures flushness. 1/4" Shank for drill press or hand drill. Cuts metals or plastics. Micrometer Stop \$7.25; HSS Cutters— 7/16" dia. \$1.75, \( \)4" dia. \$2.35. Specify Incl. angle and pilot. Folder free.

AERO TOOL COMPANY 229 WEST OLIVE - BURBANK, CALIFORNIA

#### High Speed Cutting Tools

 Special high speed circular, dovetail, flat form and special tool bits.
 Design and manufacture of small machines, jigs, gages and experimental parts.
 Regrinding and salvaging high speed flat form, special bits and small flat broaches.

Write for quotes.
Attractive Proposition for Representatives

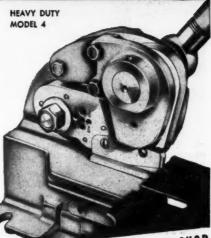
LINCOLN PARK MANUFACTURING CO. 3304 Dix Road Lincoln Park, Mich.



Anyone can operate a Dahlstrom Tap Guide. Just fasten it to a post, slip a Tap Adaptor into the spindle and turn the handle. Cuts tap breakage down to zero. \$52.50 F.O.B. Minneapolis, including / Adaptors. At mill supply houses, or Dahlstrom Mfg. Co., 418 South 6th St., Minneapolis 15, Minn. Ask for circular.

Dahlstrom TAP GUIDE

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USE THIS HANDYMAN OF THE SHOP

FOR: OUTSIDE NIBBLING
INSIDE NIBBLING
SHEARING
ROD CUTTING

• It's easy to cut irregular shapes with Heinrich No. 4 Handnib. Double crank construction does the trick . . . enables tool makers to speed up cutting of templates and trial blanks. It's rugged . . . takes 3/16" flat stock with ease . . round stock to 3/8". May be clamped in a vise or mounted on a bench. A request brings folder with full details.

NATIONAL MACHINE TOOL CO.
DEPT. 117-F, RACINE, WISCONSIN

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#### Dayton Rogers Adjustable Magnifier

An adjustable magnifier which is said to have endless uses in and about the average shop not only for general allThe lens, which is 1½ inches in diameter, is provided with full universal mounting on a heavy pressed steel base and has a maximum height adjustment of 2 inches. The maximum overall height of the magnifier is 3½ inches.



Dayton Rogers Adjustable Magnifier

round tool and diemaking but for spot checking, inspection, and general use is now being marketed by the Dayton Rogers Manufacturing Co., 2835 12th Ave. South, Minneapolis 7, Minnesota.

#### "Seco" Adjustable Snap Gage

Furnished in 15 sizes providing a total range of up to 4.75 inches, an adjustable snap gage to be known as the "Seco" is now being marketed by D. W. Botstiber & Associates, 300 W. Upsal St., Philadelphia 19, Pa. A feature of the gage is a housing of molded plastic which is said to protect the instrument from mechanical abuse, rough handling, splashing of oil or coolant, and non-uniform temperature changes. The housing also provides a convenient means for marking the gage by using a name plate inserted into the housing and covered by a transparent plastic window. Moreover, the housing includes provisions for sealing by metal caps which fit over the heads of the assembly screws.

The C-frame of the gage is made of pressed steel which is treated for dimensional stability and rust-proofed. One end

#### CARBOLOY TIPPED SCRAPER BLADES

Especially good for hard alloy iron and extremely hard bronze castings. If you are using Anderson Hand Scrapers it is not necessary to buy complete new scrapers in order to use carboloy tipped blades. Simply remove highspeed blade and slip in the Anderson Carboloy Tipped Blade. Available in three widths.





Send for Bulletin 6-22
ANDERSON BROS. MFG. CO., Rockford, III.

See Our Catalog in Sweet's

Hand and Power Hydraulic Presses, Balancing Ways, Roto Checkers, Hand and Power Scrapers, Spotters.



What do they look like after storage or transportation?

### PRECISION DUST CAPS AND THREAD PROTECTORS

insure safety from moisture, rust, dust, grit, internal and external. Will not corrode finest finishes. Fit any shape. Send for folder and prices.



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Mfrs. of Precision Paper Tubes, Bobbins, Coil Forms

#### 6" QUICK-SET VISE AND ROTARY INDEX BASE



Precision Tool Room and Manufacturing Vise. 61/2 inch opening.

To adjust—lift latch handle and advance or

To adjust—lift latch handle and advance or withdraw jaw from work.

To lock or unlock—turn pressure screw 1/2 turn.

Detachable 10" rotary index base graduated each degree of 360. A valuable tool in itself.

Write for folder.

THE GECO, INC.

30 Grove St.

New Canaan, Conn.

## Quick Acting JOHNSON FURNACES

TREAT HIGH SPEED STEELS
BRAZE CARBIDE TIPPED TOOLS
HARDEN HIGH CARBON STEELS
JOHNSON HI-Speed No. 120



Compact, powerful, and remark-ably economical in operation. Reaches 1500° F. in 5 minutes. De-livers 2300° F. in 30 minutes. Easily regulated. Holds temperature at desired level for accurate heat treating any steel tools or dies. Gets the gas. Firebox 5 x to save time and 3/4 x 131/2.

Complete with Carbofrax Hearth, G.E. Motor and Johnson Blower.

\$145.50 F.O.B. Factory

There's a Quick Acting JOHNSON Unit for Every Toolroom

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JOHNSON GAS APPLIANCE CO. 571 E Ave. N. W., Cedar Rapids, Iowa

47



"Seco" Adjustable Snap Gages

of the frame contains a gaging anvil of high grade tool steel which is hardened, ground and lapped, and serrated to provide for maximum contact with the workpiece. The serrations are also said to prevent undue adhesion of the gage block used for adjustment.

The gaging points of the instrument

are slightly crowned and hard chrome plated. The crowning of the gaging points is said to eliminate errors in gaging round pieces after the gage has been adjusted with parallel gage blocks. The adjusting system of the gage utilizes a novel principle which is claimed to make adjusting of the gage easy and to provide an accuracy of adjustment of 0.00004 inch. This extreme accuracy is obtained by utilizing the elastic elongation of the gage bolts for fine adjustment, while the threads are used for coarse adjustment.

#### **Acromark Embossing Dies**

Designed for working aluminum or magnesium alloy strips, the embossing dies shown herewith, products of The Acromark Co., 9 Morrel St., Elizabeth 4, N. J., are produced by a method whereby the embossed faces of the letters and design are absolutely flat to permit attractive application of color enamel on the faces. This is accomplished by precision engraving, to a limited depth, the female die and then highly finishing the faces of the sunk engraved letters and design of the die to provide for a flattening or coining result when the male and

## HAVING Trouble WITH TAPPING ?

If you find that tapping and reaming jobs are coming through with oversize or bell-mouthed holes, there's no longer any reason why you should let it get you down.

Do what others did who were up against the same difficulty—a problem usually of aligning the work with the spindle. Get a Ziegler Floating Tool Holder!

By compensating for faulty alignment—even as much as 1/32" radius or 1/16" diameter—the Ziegler Holder puts an end to oversize and bell-mouthed holes and enables you to turn out work to the finest of tolerances.



Types to fit any machine used for tapping or reaming.





W. M. Ziegler Tool Co.

1928 TWELFTH ST. DETROIT 16, MICH.

## OILY FLOOR TROUBLES stopped with FULLERS EARTH!

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An oil and grease absorbent that replaces sawdust or wood shavings. Lessens fire hazard! Stops accidents due to slipping on oil or grease! Low priced—economical—sate! Write for FREE SAMPLE or ask for trial order at quantity price!

> TAMMS SILICA CO. 228 N. LaSaile St., Chicago 1

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THREAD GRINDING
BROACHING
MAGNETIC INSPECTION





NOBLE & WESTBROOK MFG. CO.

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## Dependable B-RIGHT-ON SOCKET SCREW PRODUCTS

You can depend upon Brighton for quick delivery of all stock sizes; also prompt shipment of special orders. New facilities and new methods of volume manufacture make BRIGHTON Socket Screw Products



uniformly excellent . . . unsurpassed for dependability.

Ask your distributor for
BRIGHTON Products. If he can't supply you, write to us.

BRIGHTON SCREW & MFG. CO.

June, 1947

READING RD. AT DORCHESTER CINCINNATI 2. OHIO



SIMPLY INSERT OPTI-SETTER in drill jig, align cross lines to work layout, clamp drill jig, remove OPTI-SETTER, and drill!

**OPTI-SETTER** Eliminates centering errors when drilling to layouts.

Retains accuracy of original layout, whether machine drilled or drilled by hand.

A handy, low-cost tool with dozens of applications in every shop on drilling, measuring and inspection problems!

FREE FOLDER

describes Opti-Setter and uses. Write for your copy!

#### THE BENTON CO.

BEPT. M, 351 S. LA BREA AVE. LOS ANGELES 36, CALIF.

MANUFACTURERS OF OPTI-TOOLS



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Acromark Embossing Dies, made by a process that produces sharply-formed edges and clean-cut design.

female dies are forced together beyond the embossing requirement.

The dies illustrated are 6 x 2½ x 1¾ inches thick when closed. The size that such dies may be made is only limited by the capacity of the press in which the dies are used.

#### **Crozier Tool Post Turret**

Set-up time and downtime in general toolroom lathe work are claimed to be virtually eliminated through the use of the Crozier Tool Post Turret illustrated herewith, product of the Crozier Machine Tool Co., 684 N. Prairie Ave., Hawthorne, Calif. Designed for bolting firmly in place on the lathe, the turret is constructed to hold any four tools simultaneously, thereby reducing the need for resetting and recentering tools.

Indexing of the turret is readily ac-

or one carret in reading as

Crozier Tool Post Turret



## OPTI-LOCATOR NUMBER—

#### SPLITS THOUSANDTHS

ON MACHINE TOOL SET-UPS!

OPTI - LOCATOR visually alians spindle axis with workor less! Simplifies set-ups on pay no premium in effort!

#### piece location in 60 seconds lathes, mills, jig borers, drills, etc. Automatically corrects for spindle run-out. -Resulting accuracy far greater than most jobs require . . . yet so easily obtained you

#### OTHER OPTI-TOOLS **OPTI-SETTER.** The

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tool for accurate locating in both portable and drill press work. Inserts in drill bushing. Magnified crosslines in Opti-Setter

center jig to scribed location marks.

#### OPTI-CHECK.





pensable to tool grinding departments.

Circulars On Request.



FREE CPTI-LOCATOR FOLDER shows many uses, describes methods. Write for copy today!

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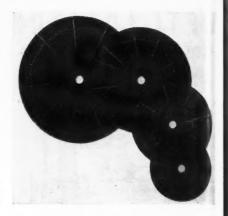
9 Morrell St., Elizabeth 4, New Jersey

complished by "opening" the handle and revolving the turret manually. The prelocation is determined automatically by a powerful detent mechanism without the operator having to "feel" for the correct position. When the turret has been revolved to the desired tool, the handle is "closed." Close indexing is said to be maintained through the provision of hardened pins closely fitted into holes in the hardened turret body. The Crozier Tool Post Turret is available in three sizes; small, medium, and large.

#### American "Ripper" Cut-Off Wheel

Designed on the same principle as the fast-cutting ripsaw used in woodworking, an abrasive cut-off wheel to be known as the "Ripper" has been announced by the American Emery Wheel Works, Richmond Square, Providence 1, R. I. According to the manufacturer, the wheel is unique in having a "set" which allows it to cut cool and fast over long periods of time.

The sides of the wheel are made with radial depressions of 0.006 to 0.008 inch deep, extending from the flange area to the edge of the wheel. The minimum



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American "Ripper" Cut-Off Wheel

thickness of wheel is  $\frac{1}{18}$  inch in 6-inch and  $\frac{3}{24}$  inch in 8, 10, and 12-inch sizes.

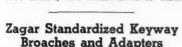
The American Ripper Cut-Off Wheel is manufactured in sizes from 6 to 12 inches in diameter in the proper "American" grlt and grade for cutting all materials from steel to stone.



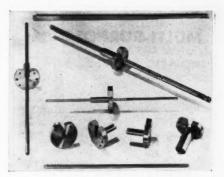
#### Penetone Triple-Acting Cutting Fluid

A triple-acting cutting fluid that is said to combine the three essential requirements of lubrication (cooling, cleaning, and gentleness to the hands) is announced by The Penetone Co., Dept. 12, Tenafly, N. J. The product is described as a non-inflammable and non-toxic liquid concentrate which is diluted with approximately 15 parts of water for use as a cutting fluid.

Designed to eliminate the need for cleaning off cutting oils from parts after machining, Penetone Triple-Acting Cutting Fluid is said to actually clean the metal as it lubricates and cools. Moreover, the fluid is unharmful to the hands since it contains no solvents, abrasives, or free alkali, the manufacturer claims.



Engineered for use on the Zagar 20inch horizontal broaching machine, a line of standardized keyway broaches in sizes from ½ to ½ inch is now being offered by Zagar Tool Co., Inc., 23880 Lake-



Zagar Standardized Keyway Broaches and Adapters

land Blvd., Cleveland 17, Ohio. Accurately machined and properly hardened and ground to assure standardization and precision, the broaches are automatically positioned to cut to the proper depth by hardened and precision ground horn-type adapters having a close fit in the pocket of the faceplate on the broaching machine in use.

Broaches of different sizes can be



CRATEX cuts **faster**, polishes **better** and lasts **longer**. Requests for Catalog, samples or specific information will be answered immediately. At Tool and Supply Dealers.

CRATEX MANUFACTURING CO., 97 Natoma St., San Francisco, Calif.

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#### MULTI-PURPOSE VISE



#### Ready-made fixture saving much tooling

In sizes up to 124 lbs., serves as plain vise, or with V jaws, shell jaws, stops, guides, etc., as repeat-operation fixture on drill press, planer, shaper, miller, grinder.

#### "Adjust-angle" KNURL HOLDER

Many patterns using only straight knurls









Fits lathe turret. Produces many patterns on work up to  $2^{1/2}$ " dia., using only straight knurls, by ''adjust-angle'' feature.

Request **Bulletin 41** 

giving full details of applications and prices.

318



GRAHAM MFG. CO.

33 BRIDGE ST., EAST GREENWICH, R. I. quickly interchanged by the selection and installation of the proper adapter to suit the bored hole in the part to be broached. The adapters are available in sizes from 1/2 to 11/4 inches.

> Carborundum "Series 20" **Grinding Wheel**

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Designated as the "Series 20," a ceramic or vitrified bonded grinding wheel for use in surface grinding, (horizontal



Carborundum "Series 20" Grinding Wheel

spindle) tool and cutter grinding, and surface and cylindrical grinding of forms has been developed by The Carborundum Co., Niagara Falls, N. Y. Advantages which are claimed to result from the use of the wheel include unusually fast stock removal, minimum grinding labor hours, minimum of damaged tools, long tool life, minimum heat generation, and improved tool finishes.

The Carborundum Series 20 Grinding Wheel is available in a narrow pattern of grits and grades to cover a wide range of operations. These include wheel types specifically designed for (1) surface grinding, and (2) tool and cutter grinding, (3) surface form grinding, and (4) cylindrical form grinding operations. In addition to toolroom applications, the Series 20 wheel can also be used to great advantage for certain production operations, the manufacturer states.

#### "Universal" Precision Radius Dresser

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A unique simplification in radius dresser setting which reduces set-up time required for grinding wheel dressing is claimed to be provided by the "Universal" Precision Radius Dresser produced by Universal Vise and Tool Co., Parma, Mich. The dresser can be easily set with gage blocks, inside micrometer, height gage, or planer gage, thereby allowing less skilled operators to obtain maximum machine accuracy. Radius pre-



"Universal" Precision Radius Dresser

cision is limited only by the accuracy of the setting device, tolerances as small as 0.0001 inch being easily maintained, the manufacturer states.

The Universal Precision Radius Dresser can be used to produce convex, concave, and compound radii from 0 to 1 inch on wheels up to 7 inches in diameter. It may be held either vertically or horizontally on a magnetic chuck. The frame and arbor are of cast iron to provide for maximum rigidity and lasting accuracy. The dresser is furnished complete with a wooden case and two mounted diamonds.

#### Geco 6-Inch Quick-Set Vise with Rotary Index Table

Instantly adjustable to any desired position simply by lifting a latch handle and shoving the jaw, with virtually no effort, against the work, a 6-inch vise with separate 10-inch rotary index base

# DIAMOND TOOLS DIAMOND WHEELS DIAMOND POWDER

Our No. 703X—Three layers containing a total of 20 diamonds. Multiplicity of cutting points; depending on diameter of wheel, four or more diamonds will always contact the wheel, giving finer dressing and precision finish. Recommended in all straightfaced dressing and truing on wide-faced, hard silicon carbide wheels. Used most effectively on Norton Cylindrical, Landis Cylindrical, Cincinnati Cylindrical Grinder and (with special Adapter) on Cincinnati Centerless Grinders

Requires fewer passes across the wheel. Generally used with fast dressing traverse.



31 W. 47th St., New York 19, N. Y.

#### Representatives:

Buttalo—Iroquois Carbide & Abrasive Co., 91 W. Grimsby Road Pittsburgh—Commonwealth Sales Co., 200

Magee Bldg. Chicago—J. R. Mendelssohn, 4744 Wood-

lawn Ave. Cleveland—John P. Roberts, 3833 Silsby

Road South Bend—Formrite Tool Co., Inc., 321 N. Michigan St.

Moline — L. R. Christiansen Co., Fifth Ave. Bldg. Milwaukee — Redi Products Co., 211 South 2nd St.

"There is no economic substitute for diamonds."



Geco 6-Inch Quick-Set Vise with Rotary
Index Table

is now being marketed by The Geco, Inc., 30 Grove St., New Canaan, Conn. A simple one-half turn of the pressure screw of the vise is all the motion that is said to be required in order to lock the moving jaw. Once locked, the jaw cannot slip, it is stated. Any desired amount of pressure can be obtained by further turns of the pressure screw.

Designed to provide for long life, the Geco 6-Inch Quick-Set Vise is constructed with nickel, semi-steel castings, tool steel plates, and bronze bearings. Two hold-down lugs are provided for fastening the vise to either its rotary base of any milling machine, drill press, grinder, and so on. Keys are provided on the bottom surface of the base to assure accurate alignment.

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Specifications of the vise are as follows: width of jaws, 7 inches; depth of jaws, 2 inches; vise length, 16½ inches; vise height, 4½ inches; ftoor plate width, 6 inches, and maximum opening of jaw, 6½ inches. The vise is supplied complete with two locating keys and one wrench handle.

The 10-inch rotary index base furnished with the vise includes a generous face bearing surface, ground to close limits. A T-slot through the center of the bearing surface provides for positive locating of the vise or other work. The graduated upper table can be set in any desired position and firmly locked by means of a screw. Once locked, the table cannot rotate until the lock screw is released by the operator, it is claimed.

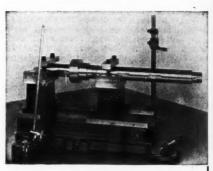
If desired, the index base can be used separately from the vise for toolroom or production work. A tapered groove is provided about the upper plate to which index blocks may be fastened. An automatic spring-loaded index pin engages the index blocks as the table is rotated.

Illustrated at the right is the HART-FORD V-BLOCK FIXTURE adapted for inspection work. Parallelism of bored holes, hole spacing and milled faces can be checked accurately on the HARTFORD V-BLOCK FIXTURE.

Also a great time-saver on milling, boring and drilling. Simplifies tough set-ups, is practical and convenient for locating and holding a wide variety of irregular shaped work. Simple in design and rugged construction helps make the HARTFORD V-BLOCK FIXTURE a worthwhile investment in any machine shop.

Write for illustrated circular.

## The Hartford V-BLOCK Fixture



#### THE HARTFORD SPECIAL MACHINERY CO.

HARTFORD 5

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In this manner, divisions of a circle from 2 to 40 divisions may be obtained for repetitive indexing. The index base is furnished complete with two index blocks and one Allen lock wrench.

#### "Kam-Grip" Milling Fixture

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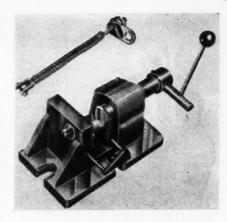
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Recommended for toolroom or production use, the "Kam-Grip" Milling Fixture illustrated herewith is now being marketed by Manufacturer's Engineering Service, Inc., 415 Security Bank Bldg., Toledo, Ohio. While primarily designed as a production milling fixture, the unit can also be readily adapted as a work holder for use in performing tapping, drilling, reaming, deburring, spot-facing, chamfering, grinding, bench assembly, and other operations.

When used on a milling machine, the work is clamped in the fixture by manual operation. However, when used in performing drilling or tapping operations, the fixture can be automatically operated by the action of the press. The fixture is supplied completely equipped with a lock-and-release rod and two sets of interchangeable anvils and movable

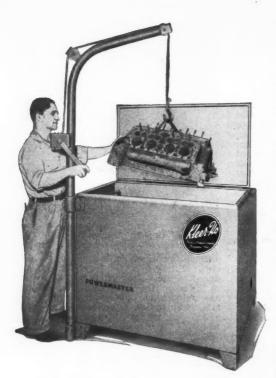
jaws to accommodate round, hexagon, or square stock from % to 1% inches in size. Rigidly and ruggedly constructed to



"Kam-Grip" Milling Fixture

withstand shop use and abuse, the Kam-Grip Milling Fixture is provided with duo-directional key slots in the bottom of the base. All wearing parts of the unit are constructed of heat-treated machine steel. The fixture is 4% inches high, has a base length of 7% inches and base width of 4½ inches, weighing 14 pounds.





"Kleer-Flo Powermaster" Industrial Parts Washer

The development of a power-agitated degreaser for heavy duty industrial maintenance cleaning operations, to be known as the "Kleer-Flo Powermaster," is announced by the Practical Products Co., 2632 Nicollet Ave., Minneapolis 8, Minn. According to the manufacturer, the machine is designed to "hot wash"

"Kleer-Flo Powermaster" Industrial Parts Washer in

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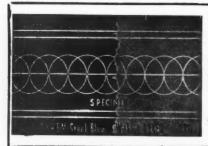
a product as large as an entire engine block in one operation. A washing pressure for the heated cleaning compound is produced by rapid vertical strokes of a motor-driven rack. Using Kleer-Flo Hi-T "Grease-off" cleaning compound, grease and grime are said to be quickly and efficiently removed from the work.

The Kleer-Flo Powermaster Industrial Parts Washer is also claimed to be ideal for the cold washing of quantities of small parts such as carburetors, fuel pumps, brake shoes, clutch assemblies, and industrial machine parts.

Roll-In All-Purpose Metal-Cutting Band Saw

For cutoff work, flat bar stock, round stock, angle cuts, contour work, die work, toolrooms, garage work, filing, sheet metal work, and various other types of sawing in metals

and other hard materials, the Roll-In Saw Co., Parma, Mich., has brought out the Roll-In All-Purpose Metal-Cutting Band Saw illustrated herewith. The machine utilizes a gravity-feed principle whereby the blade rolls into the work. Wear on the blade is reduced since the correct blade pressure is said to be automatically maintained. According to the manufacturer, stock need not be clamped for flat work since the saw feeds



### DYKEM STEEL BLUE

Stops Losses in Making Dies and Templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information.

#### THE DYKEM COMPANY

2301F NORTH 11th ST.

ST. LOUIS, MO.

(In Canada: 2466 Dundas St. West, Toronto, Ont.)

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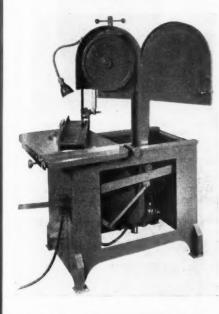
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The Roll-In All-Purpose Metal-Cutting Band Saw measures 5 feet 1 inch high x 3 feet 4 inches deep x 30 inches wide and weighs 640 lb. The unit is equipped with an 18½ x 30-inch table which is located 30 inches from the floor. The machine is designed to accommodate 9-foot long blades of ½, ¼, ¾, ½, ¾, and ¾-inch



Roll-In All-Purpose Metal-Cutting Band Saw

widths, and is provided with four speeds of 70, 140, 270, and 500 feet per minute. It can also be built with higher or lower

speeds if specified.

The machine has a maximum cut of 8% inches vertically and 8% inches into the work (no limit to lengthwise cut). It is powered by a % h.p., 110-220 volt, 60cycle, single phase, a.c. motor. Additional features of the unit include a tension control handle which provides an adjustment of 6 inches for keeping the saw blade at the proper tension; 14-inch diameter blade wheels of grooved design; adjustable ball bearing saw guides; in stant acting (removable) graduated work-holding block; rip fence; starting switch; frame control handle for returning the saw to a non-operating position;



Profilm Laminated Glass Surface Plates are finished to ,00005" surface accuracy. No sticking, no vibration of gages. Made of 5 to 16 layers of glass they are laminated for greater strength and advantability.

Profilm Surface Plates give greater visibility and tend to eliminate all shadows usually found when working with other type of plates. Profilm Surface Plates are 16" x 17" in size and 2" thick. They are nonmagnetic, non-corrosive, non-abrasive, do not sag or warp and temperature resistant. Thousands already in use . . . Be sure to order yours now, we can still give early delivery.



hinged blade wheel housing; ball bearing rollers on track; worm gear speed reducer gearbox; rigid all steel base with holes in legs for casters; stop clamp and measuring rule; and work light.

For special jobs, various accessory equipment is available for the machine, including a filing attachment, butt welder for band saw blades, and wet-cut unit.

#### Henry Type SV-11 Solenoid Valve

Production of a solenoid valve which is designed for small capacity installations involving the use of Freon, methyl chloride, water, air, oil gas, and so on, is announced by the Henry Valve Co., 3260 W. Grand Ave., Chicago 51, Illinois.

Incorporated in a standard outlet box, the valve, which is designated as the Type SV-11, can be quickly mounted through screw holes provided and electrical connections can be easily made by utilizing one of three knockouts in the outlet box. The coil can be removed and replaced without disturbing electrical connections to a thermostat or other electrical devices. An efficient magnetic circuit is said to provide for low current consumption and the "floating plunger"



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Henry Type SV-11 Solenoid Valve

is claimed to ensure quiet operation.

Designed to meet all requirements of
the Underwriters' Laboratories, the
Henry Type SV-11 Solenoid Valve is furnished with %-inch f.p.t. connections for



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#### CUT STRAIGHT WITH A CURVE

With

# Aber CURVED TOOTH Milling Cutters

Maintain That Width With the "CHATTERLESS FLOWING ACTION" of a Curved Tooth Overlapping Side Milling Cutter.

SEND FOR CIRCULARS

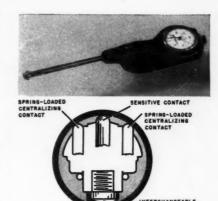
ABER ENGINEERING WORKS, Inc., Waterford, Wis.

115 volts, 60-cycle or 230 volts, 60-cycle current. The valve can also be mounted in an approved metal enclosure, minus the outlet box. Lock nuts are threaded onto the body for use in mounting same. The valve can also be obtained with large type outlet boxes where multiple electrical terminals are required.

#### Federal Model 1204 Small Hole Gage

A self-centralizing indicator gage which shows size variations in tenths of thousandths' the Federal Model 1204 Small Hole Gage illustrated herewith, product of the Federal Products Corp., 1144 Eddy St., Providence, R. I., is said to allow for the thorough inspection of inside diameters between 0.250 and 0.500 inch. The gage utilizes 14 interchangeable extensions to cover a range from ¼ to ½ inch and can be used to check any hole within its capacity to a maximum depth of 2¼ inches, revealing diameter as well as roundness, taper, bellmouth, and other hole inaccuracies.

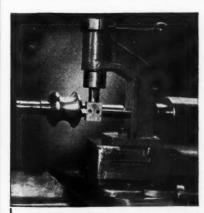
The Model 1204 can be used as a single-



Federal Model 1204 Small Hole Gage

REFERENCE CONTACT

purpose inspection tool or for checking a wide variety of hole sizes. Being a pointto-point contact gage, it is said to reveal any small area imperfections in the hole. All contacts, both measuring and cen-





### CONCAVE-CONVEX TURNING TOOL

No. 1—Tool made for 9" to 14" Lathes. Price Complete........\$ 52.00 No. 2—Tool made for 16" to 36" Lathes. Price Complete........\$128.00

When ordering, state "T" slot dimensions—also distance from center line of spindle to top of compound rest. All steel parts case hardened.

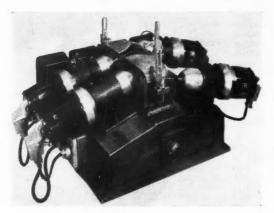
J. E. FREYMAN & SONS Write today for full particulars.

3627 KESWICK ROAD, BALTIMORE 11, MD.

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Simplex Four-Way Special Drilling Machine

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After locating and clamping, the part to be machined is drilled by four high speed drilling units from underneath, as shown in the accompanying illustration. The forward and reverse movements of the spindles are controlled by a single push-button located on the front of the machine. The actual time required for drilling the four holes in each part is said to be only a few seconds. The drilling units each have a capacity for drilling holes up to  $\frac{4}{12}$  inch in diameter and can be mounted in any position desired.

tralizing, are hard chrome plated and carefully radiused for long-lasting, accurate service.

Extremely light and designed to fit the hand comfortably, the Federal Model 1204 Small Hole Gage is supplied packed in a plush-lined wooden case and is furnished complete with adjusting wrenches and the extension or extensions required. It can be easily adjusted for a particular dimension with a master ring of the proper size. The indicator dial of the unit is designed to show dimensional variations as small as 0.0001 inch or as large as plus or minus 0.004 inch.

Simplex Four-Way Special Drilling Machine

Production of a four-way drilling machine specially designed for drilling four holes at an angle in typewriter covers is announced by the Simplex Tool Engineering Co., 2540 Park Ave., Detroit 1, Michigan.

#### Wilson Stainless Steel Electrodes

A complete line of stainless steel electrodes in a full range of grades and diameters has been announced by Wilson Welders & Metals Co., Inc., 60 E. 42nd St., New York 17, N. Y. Each electrode is furnished with a heavy extruded lime type coating for d.c. application. In addition, all of the electrodes but the straight chrome analyses are obtainable with a lime-titania type coating which can be used with a.c. or d.c. The slag produced by either of these coatings is claimed to be easily removable.

Electrodes with the lime-titania type coating are said to afford many desirable features, including elimination of arc blow, easy manipulation, uniform arc action, and good appearance of deposit. According to the manufacturer, this class of electrode is recommended for all applications on which the lime type of electrode is used with the possible exception of highly restrained joints on heavy sections or on steels of high hardenability.



## TO RAISE PRODUCTION — CUT COSTS THE READING BROACH KEYSEATER

The Reading Bench Machine does not require bushings or guides. No other machine like it Very fast—capacity from 1/8 to 3/8 cutter.

Low first cost—prompt delivery.

READING MACHINE COMPANY

Reading (Cincinnati), Ohio

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#### Feedall Model H-1000 Automatic Hopper Feed

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A fully automatic self-contained hopper feed unit which can be readily attached to a wide variety of high production machines, thereby eliminating costly hand feeding operations, is announced



Feedall Model H-1000 Automatic Hopper Feed

by the Feedall Machine and Engineering Co., 70 Vine St., Willoughby, Ohio. Designated as the Model H-1000, the unit is said to be capable of feeding cylindrical work up to 1½ inches in diameter and up to 6 inches in length. It can also be used to feed headed or shoulder work up to 1½ inches in diameter and 6 inches in length.

Constructed to feed a wide variety of parts with a minimum of adjustment, the Feedall Model H-1000 Automatic Hopper Feed is powered by a ½ h.p. motor coupled to a variable speed V-belt drive which is adjustable while the machine is

# STEEL APRON BRAKE

4' FOR 12 GAUGE 6' AND 8' FOR 14 GAUGE



EASE AND SIMPLICITY
HAND OPERATED
ENGINEERED AND BRACED
TO DO THE JOB RIGHT
FULLY GUARANTEED
QUICK DELIVERIES

Write for Circular

WM. C. JOHNSON & SONS MACHY. CO.

1211 Hadley St.

St. Louis 6, Mo.

operating, thereby assuring a smooth

flow of work to the machine.

Some of the machines with which the Feedall Model H-1000 can be used are centerless grinders, double-end grinders, automatic screw machines, drilling machines, and many types of special machines. Moreover, the unit can be used in feeding work through induction heattreating machines. Types of work which can be fed with the unit include special bolts, screws, bushings, piston pins, valve slugs, automotive valves, tube fittings, tappets, and other similar automotive forgings.



BEVERLY Throatless SHEAR

Cuts straight and irregular shapes faster—betterl Order No. 1 for 14 ga. (with High Carbon, High Chrome Blades for 18 ga.); No. 2 for 10 ga. (with H.C.H.C. blades for 14 ga.); and No. 3 for  $\frac{8}{16}$ ° mild steel or 10 ga. stainless. Write for catalog!

THE BEVERLY SHEAR MFG. CO. 3004 W. 111th St., Dept. 3, Chicago 43, III.

#### **Huot Drill Case**

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The Huot Manufacturing Co., St. Paul 1, Minn., announces the addition of the drill case shown herewith to its line of



**Huot Drill Case** 

metal drill indexes. The unit includes openings for drills from  $\frac{1}{16}$  to  $\frac{1}{2}$  inch in increments of  $\frac{1}{32}$  inch.

According to the manufacturer, the case provides small shop owners in industry and home craftsmen with a protective container for an assortment of 15 drills and is indexed in fractions of an inch as well as decimals.

#### Aerol Aluminum Alloy Rubber-Tired Caster

An aluminum alloy rubber-tired caster in both rigid and swivel types is announced by the Aerol Co., 1823 E. Washington Blvd., Los Angeles 21, Calif. Features of the caster include a heavy duty

#### PRODUCERS OF SCREW MACHINE PRODUCTS TO SPECIFICATIONS

We have:

328

ONE, FOUR and SIX spindle automatics maximum capacity 25%" round. Hand Screw Mashines and Universal Turret Lathes maximum capacity 3" round. Castings and Forgings machined maximum 10" diameter, 8" length, 15 pound weight. Secondary operation equipment for milling, drilling, tapping and assembling. Fabricators of aluminum, brass, steel and their alloys.

WRITE FOR ESTIMATE

SCREW MACHINE SPECIALTY CO., • 5700 Butler St., Pittsburgh 1, Pa.

shakeproof king pin, labyrinth dirt seal to protect lubricated bearings, and extra offset for instant trailing.

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47

The light, strong aluminum alloy construction of the caster is said to increase efficiency by reducing dead weight without sacrificing strength requirements. The smooth surfaces of the unit are said to readily shed dust and dirt. The precision construction of the wheel assembly and the use of Timken tapered roller bearings on the race assure straight,



Aerol Auminum Allov Rubber-Lined Caster

even tracking and sensitive swivel action even under heavy loads, it is claimed.

Both thrust and king pin bearings are factory-greased Timken tapered roller types that are said to eliminate all axle wear and side play. An aluminum retainer ring is provided to seal grease in and keep foreign particles out of the assembly, thus eliminating the necessity for lubrication under normal conditions.

The Aerol Caster is available in a complete range of sizes with tough, all-purpose solid rubber tires that are said to resist oil and water and are said to be guaranteed not to separate from the wheel core.

Revolute M4 Automatic Blueprinting Machine

For the high speed production of blueprints, whiteprints, vandyke prints, and blueline prints, the Paragon-Revolute Corp., 77 South Ave., Rochester 4, N. Y., announces the Revolute M4 Automatic



### New Model 70



#### Multi-Wheel Numbering Machine

The most efficient method of stamping numbers into metal. Repeats the same numbers until changed. Model 70 NUMBERALL Machines are used in all industries to mark various parts. Stamps numbers, etc., quickly . . neatly. Perfectly aligned. Much better marks are produced by these machines than by single stamps or steel type, and at a far lower cost. Shank for Hand or Press and with any number of wheels from 3 to 20. Model No. 70

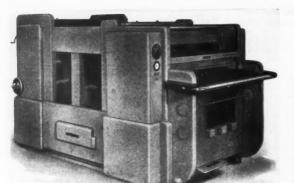
Write for Bulletin MS-70.

Improved Type Holders, Hand or Press Style. Super Quality Steel Type.

Type is easily, quickly loaded and unloaded. Simplest construction. A pin holds the type



NUMBERALL STAMP & TOOL CO. HUGUENOT PARK STATEN ISLAND 12, N. Y



Revolute M4 Automatic Blueprinting Machine

Blueprinting Machine illustrated herewith. Rigidly contstructed and finished in gray wrinkle, the machine utilizes the revolving contact principle for providing slip and static-free contact between the tracing and the sensitized material. This principle utilizes a Pyrex glass cylinder which revolves while the light source remains stationary. The tracing and sensitized material are firmly gripped between cylinder and contact bands.

The M4 is supplied equipped with either a 75 or 95-watt quartz lamp to provide maximum printing speed and efficient and uniform light output. An aperture control is provided for governing the exposure area of the contact glass. Thus, the proper exposure can be given tracings of various densities without changing the machine speed. The drive mechanism provides an infinite number of speeds from

d

60 inches to 32 feet per minute, which are indicated on a tachometer on the instru-

ment panel.

Auxiliary feed belts operating in conjunction with the contact belts carry the tracing to the point where it is gripped between the glass, paper, and contact belts, thus allowing for easy and accurate feeding of the machine. A patented double chemical applicator makes possible the complete submersion of

# NEW! LOW COST, KNEE TYPE MILLING MACHINE . . . designed for small, accurate work



GENERAL SPECIFICATIONS

 Longitudinal Feed
 6"

 Traverse Feed
 1½"

 Vertical Feed
 4"

 Floor Space
 21x14½"

 Tapered Gibs

No. 5 B. & S. Spindle Taper

All rotating parts moving in anti-friction bearings.

All sliding members moving in scraped dovetailed ways.

> Manufacturers of Precision Knee Type Milling Machines and Production Attachments

BURKE MACHINE TOOL CO.

500 Sandusky Street CONNEAUT, OHIO

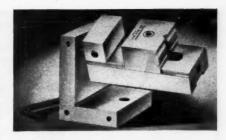
330

prints in a chemical solution to assure thorough development and fixing at any speed. Spray washes are used to speed up the thorough washing of prints. An interval timer assures the proper drying temperature for prints for any speed of operation. A single plate clutch automatic compensating device on the finisher maintains even tension on the paper during its entire travel through the machine. The device is instantly adjustable for all weights of paper and is arranged to take up all slack automatically.

The Revolute M4 utilizes six 8-inch diameter metal cylinders or drums for drying the prints. The drums are nested in such a manner that maximum wraparound is obtained to assure thorough drying. The drying drums, driven by the paper itself, are mounted in large sealed ball bearings packed with high temperature lubricant to assure free rotation with the paper.

Sta-Ga-Co Combination Vise and Angle Plate

Said to be ideal for layout work, jig boring, drilling, tapping, inspection, grinding, and light milling, the Sta-Ga-



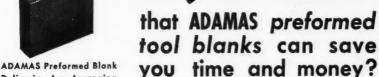
Sta-Ga-Co Combination Vise and Angle Plate

Co Combination Vise and Angle Plate illustrated herewith is now being marketed by the Gale Forssen Co., 64 Monmouth St., Springfield 9, Mass. The unit is said to be hardened and ground square to within 0.0003 inch in all directions (including vees).

The vise can be mounted at any angle desired on end or either side. The reversible jaw is provided with a flat and V-grip. All screws of the vise are designed for operation with a finith allen capscrew wrench. Specifications of the vise are as follows: length overall, 4 finithes; width, 2 inches; height overall, 2

# CARBIDE USERS





Deliveries Are Averaging

<u>Under One Week!</u>

Send for ADAMAS'
"Aids to Carbide Users"

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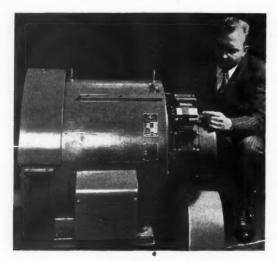
- Eliminates time-consuming grinding to required shape.
- Reduces use of diamond wheel.
- Savings far outweigh slight additional cost.

TRY ADAMAS PREFORMED CARBIDE BLANKS ON YOUR NEXT JOB — AND PROFIT BY THESE ADVANTAGES.

<u>ADAMA</u>S

CARBIDE CORPORATION
40-30 23rd STREET, LONG ISLAND CITY, NEW YORK

Producers of top quality carbide for cutting tools, dies and wear resistance-both standard and special.



inches; depth of jaw, 1 inch; jaw opening, 1% inches; screw, fe-18 (heat treat-

ed); and weight, 3½ pounds.

Specifications of the angle plate are as follows: height overall, 21/2 inches; length overall, 3½ inches; width, 3½ inches; and weight, 3½ pounds.

#### "Regulectric" High-Frequency Generator Set

Quick-acting automatic regulation to maintain rated voltage is said to be afforded by a generator set for powering high-frequency portable tools announced by the Electric Machinery Manufacturing Co., Minneapolis 13, Minnesota. Known as the "Regulectric," the generator set is available in 180 and 360-cycle types.

According to the manufacturer, the

voltage regulating circuit built into the generator provides for positive instantaneous regulation of voltage to normal whenever there is a change in load. The inherent voltage compounding of the generator set is said to automatically compensate against voltage drop occurring at the low power factor characteristic of the tools and their distribution lines.

The Regulectric Generator Set is available in ratings of 31.3 and 63 kva, in standard voltages of 240 or 480 at 180 or 360 cycles. The accompanying illustration shows the end cover

removed from a 31.3 kva 180-cycle generator to afford a view of the elements of the built-in voltage regulating circuit. The compact circuit has no moving parts and is said to require no maintenance or adjustment of voltage since it operates on the principle of electrical resonance.

#### Raar Interchangeable Punch and Die Unit

An interchangeable self-stripping punch and die unit which is said to be capable of operating in the smallest press equipment has been placed on the market by the Raar Manufacturing Co., 1663 N. Highland, Los Angeles 28, Calif. Featuring a low shut height (31/4 inches), air slug ejection, close hole centers, simplicity of construction, and complete sal-



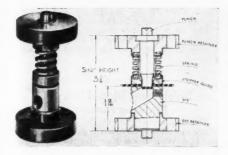
#### A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long soughta more accurate and surprisingly faster way of transferring blind screw holes.

The Heimann Transfer Screw Set is a

self-contained, complete tool. No wrenches or pliers are necessary. Made in 18" to 1" diameters. Send for price list. HEIMANN MFG. CO.

330 Lincoln Ave. Urbana, Ohio i



(Left) Raar Interchangeable Punch and Die Unit (Right) Cutaway Sketch Showing Simplicity of Construction

vageability, the unit is available in a range of hole sizes from  $_{1/2}$  to  $1_{1/2}$  inches and can be readily installed with the aid of only two screws.

The change or replacement of the Raar Punch and Die Unit is said to be easily accomplished since the stripper and stripper guide are removable by a half turn. The punch may be removed from its retainer with a light pressure, and changes can be made without disturbing the setup. Without the die retainer, the unit, as a result of its stepped die construction and height, is especially applicable for cutting-off, notching, blanking, and other press operations on standard die steels. The die may be rotated in relation to the mounting holes to provide clearance for the slug ejector opening.

M.S.A. Speedframe Welders' Goggle

The M.S.A. Speedframe, a self-adjusting welders' goggle which is designed to eliminate the waste motion and time involved in the hand adjustment of goggles, is now being produced by the Mine Safety Appliances Co., Braddock, Thomas, and Meade Sts., Pittsburgh 8, Pa. A nod of the head provides for instant raising or lowering of the goggle, thus leaving the wearer free use of both hands for handling work.

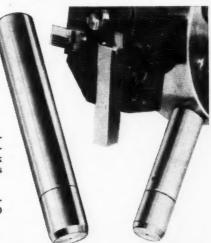
The M.S.A. Speedframe consists of a suitable goggle mounted in a lightweight fiber headframe of headline design which

# The **NEW**BOYAR-SCHULTZ Revolving Stop

This new Revolving Stop provides real economy in screw machine operation. Free-turning, live head reduces friction between work and stop; eliminates marring of piece parts and reduces variation in parts lengths.

Low price brings new economy to screw machine operation. Available in 3 sizes, 00, 0 and 2, and in 7 lengths.

WRITE FOR OUR NEW SCREW MACHINE TOOL CATALOG.



### BOYAR-SCHULTZ CORPORATION

2120 WALNUT STREET

CHICAGO 12, ILLINOIS



M.S.A. Speedframe Welders' Goggle

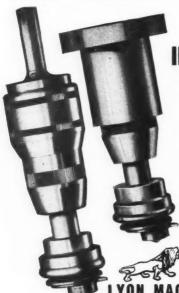
is said to hold the goggle firmly in either the up or down position without uncomfortable pressure on the temples or bridge of the nose. The goggle is fully adjustable in three directions by means of side and top straps and is held in the desired position by a simple screw-type clamp, according to the manufacturer.

The M.S.A. Speedframe can be furnished with a welders' or chippers' goggle, with or without Coverglas lenses as desired.

Noblewest Model No. 253 Marking Machine

The Noblewest Model No. 253 Marking Machine shown herewith, product of The Noble & Westbrook Manufacturing Co., 25 Westbrook St., East Hartford, Conn., is designed for permanently marking designs, names, and other inscriptions into thin walled lipstick cases. Other similar parts can also be marked with the machine, which includes an internal mandrel support for the part to be marked and a pressure dial.

The work-carrying dial of the machine is provided with 10 loading stations on which the parts are placed by hand. The dial revolves continuously and, as the lipstick case is carried around, it is rolled between a steel marking die and the pressure dial where the inscription is permanently marked into the part. The part continues to an unloading chute where the supporting mandrel recedes,



# The Lyon NTERNAL GROOVING TOOL

Its versatility saves costly preparation time—provides precision grooving of single or multiple grooves at a production rate—plus economy of set-up time—and low initial cost. The LYON has been designed for making internal grooves to tolerances of .001" using any drill press, turret lathe, radial drill or automatic equipment.

By changing only bushings and cutters within the tool model range, you have at your command a wide variety of bore sizes and shapes. A simple adjustment regulates location and depth of groove. Work cannot be scratched or marred because the head of the tool does not turn when the cutter operates.

Our Engineering Department will welcome the opportunity of discussing any grooving problem without obligation.



GROOVE LOCATED FRO BOTTOM OF HOLE



SINGLE GROOVE LOCATED FROM TOP OF HOLE

ON MACHINE CO., WORCESTER 3, MASS.

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thereby allowing the workpiece to be removed automatically and to slide down the chute into a receptacle. The work supporting mandrel is then raised ready for receiving a nother workpiece.

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The work supporting mandrels are mounted in bronze sleeves and are provided with stripper plates which are easily removable, thus allowing for the quick changing of mandrels

and stripper plates for various diameters of work. The steel marking die is mounted in a holder at the rear of the machine and is provided with both lateral and vertical adjustment. The overarm support of the machine provides for rigid positioning and excessive pressures. Thus, several lines of lettering can be produced either lengthwise or around the parts, or the inscription can consist of a design covering practically all of the outer surface of the lipstick tube.

The machine is normally made for



workpieces with diameters up to approximately % inch but can also be furnished for pieces of larger diameters. The machine has a welded steel base with motor mounted inside on an adjustable bracket. The V-belt drive to the dial shaft assembly can be easily changed for various speeds according to working conditions and the feeding ability of the operator. The dial shaft assembly is provided with a worm and gear unit operating in a bath of oil for continuous lubrication.

Said to have a production rate of 60 to

# SPEED UP PRODUCTION On Old or New Band Saw Equipment

# PADDOCK BALL - BEARING GUIDES

hold the working portion of the blade as if it were in a frame, free from friction. Inter-changeable wheels running with the blade give strong, smooth, fast support. You save blades—you can cut more materials—PADDOCK GUIDES give perfect operation under all conditions. Sold on ten day FREE TRIAL. Write for circular and price.

#### PADDOCK TOOL COMPANY

**Guide Makers Since 1920** 

1418 Walnut Street

Kansas City 6, Missouri







80 pieces per minute, the Noblewest Model No. 253 Marking Machine occupies a floor space of 18 x 24 inches and weighs approximately 500 lb. The construction of the machine is such that the feeding height is at approximately bench level.

speed and to provide for the production of accurate holes without chip-

ping or the use of coolant.

The drill is available in diameters from 3 to 11/2 inches, each size being supplied individually packed and with the tip protected by a tough plastic coating.

#### Willey's Newly Designed Masonry Drill

A newly designed masonry drill for the fast, quiet drilling of non-metallic materials, including brick, concrete, marble, slate, limestone, plaster, tile, asphalt, carbon, and wallboard, is announced by the Willey's Carbide Tool Co., 1340 W. Vernor Highway, Detroit 1. Mich. The drill is provided with a solid tip of Willey's Metal which is claimed to allow for an unusually fast drilling

#### Improved Variable-V-Planetary Speed Selector

improved Variable-V-Planetary An Speed Selector designed as an independently mounted transmission is announced by The B. F. Goodrich Co., Akron, Ohio. The speed selector employs planetary motion with four variable pitch sheaves and two standard cross-section V-belts to provide any speed from 0 to 800 r.p.m. at constant torque from a constant speed power source. The multiply-

# Save Time TURNING

## MILLING



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GRINDING

#### NICHOLSON EXPANDING MANDRELS

Save the time lost in making or looking for solid arbors. Set of 19 Nicholson expanding mandrels does the work of 209 solid arbors.

#### OTHER ADVANTAGES OF THESE WIDELY USED TOOLS

PRECISION-No parts to wear out and cause distortion.

RUGGEDNESS-Sure grip on heavy work.

For all bores, 1" to 7". Hardened stainless steel. Two types, sold singly or in sets. Used in shops the nation over.

**Bulletin 1043** 

W. H. NICHOLSON & CO., 136 Oregon St., Wilkes-Barre, Pa.

Valves . Traps . Floats . Steam Specialties

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ing action of the planetary converts a slight change in sheave pitch diameter to a wide range in output speed. The high and nearly constant belt speeds permit almost instantaneous changes in output speed by the convenient lever action self-lecking control handle of the unit.

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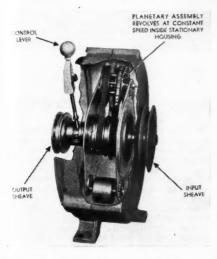
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1 and 2, the improved speed selector is symple and sturdy in construction. The design includes cast iron sheaves on hard-



Cutaway View of Improved Variable-V-Planetary Speed Selector

ened and ground shafts and guide pins with sealed prelubricated ball bearings mounted in sturdy cast aluminum housings. Optional V-belt of flexible coupling input and output make the speed selector easily adaptable for mounting in any position on new or existing equipment.

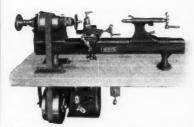
Principal applications for the speed selector include agitators, conveyors, dryers, process machinery, hoists, machine tools, mixers, plastic machinery, pumps, textile machinery, and so on.

#### "Porto-Pumper" Pumping and Fire-Fighting Unit

A complete high pressure portable pumping and fire-fighting unit to be known as the "Porto-Pumper" has been developed by Porto-Pump, Inc., 227 Iron St., Detroit 7, Mich. Compactly mounted



Integral Drive Precision Bench Lathes. Double-taper headstock bearings of highest accuracy, or best precision preloaded ball bearings. Two good sizes 3/4" and 1". 30 Precision attachments available.



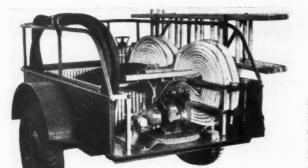
Open Cone Lathes world-known. Four sizes, with compact under-bench Motor Drive Unit.

Stark Precision Bench Milling Machine. Plain and Spiral Models



"ELECTROBLAST" High Speed Muffle Furnace. Two excellent small sizes.





"Porto-Pumper" Pumping and Fire-Fighting Unit

When fitted with flange-type wheels, the Porto-Pumper can be towed by a handcar on standard or small-gauge track. The unit includes stations for up to five extinguishers of the handtank type.

on a sturdy two-wheeled trailer, the unit consists basically of a gasoline-driven high pressure utility pump; 75 feet of supply hose; 250 feet of fire hose; an 18foot 3-section extension ladder; a fire axe, and a hand type extinguisher.

The Porto-Pumper, which can be easily attached to an automobile, jeep or truck, includes a 48 x 78-inch steel box body mounted on heavy duty tires or s tand ard automobile center-to-center track. The overall width of the unit is 66 inches and the overall length, including a 40-inch tongue, is 118 inches. The body is provided with a handrail on three sides and a hinge-mounted tailgate.

The pump of the unit is said to be capable of delivering over 40 U. S. gallons of water per minute at 120 lb. pressure and is held in position at the rear of the trailer by a patented locking device which permits the pump to be readily demounted for use at any distance from the Porto-Pumper as an independent unit. A web-foot base plate is said to prevent the pump from sinking into soft ground.

#### Starrett Oil and Water-Hardening Ground Flat Stock

The L. S. Starrett Co., Athol, Mass., announces the availability of precision ground flat stock in oil and water-hardening types. The oil-hardening type is described as a non-deforming electric furnace tool steel, fully spherodized annealed and with fine grain structure and deep hardening characteristics for precision parts requiring accuracy of size after hardening. The water-hardening type is a high grade tool steel which is specially made and annealed for easy machining and is said to develop maximum hardness when quenched in water or brine.

Starrett Ground Flat Stock is designed to expedite the production of precision parts and pieces such as die parts, flat gages, drill jigs, templates, machine and fixture parts, and other small parts having two flat parallel surfaces. It is supplied in pieces 18 inches long ranging in width from 1½ to 6 inches and in thick-

### 14 Inch Shaper and Milling Vise



Width of Jaws 13%"... Depth of Jaws 2½"... Opening of Jaws 14"... Ball Bearing Thrust on Screw... 360' Swivel Hardened Steel Inserts in Jaws... Specify Width and Spacing of Slots when ordering.

\$350.00 F.O.B. Lansing
Prices subject to change without notice.

#### MULTI-LEAD TOOL & ENGINEERING CO.

P. O. Box 306

Lansing 2, Michigan



Starrett Oil and Water-Hardening Ground Flat Stock

ness from da to 1 inch. The two flat sides are precision ground parallel, straight and to a tolerance of 0.001 inch. The ends are machined square, and the edges are ground parallel and square to the sides. Each piece is marked for size and type and is protected from rusting and scratching by an envelope on which the size, thickness, and heat-treating instructions are clearly indicated.

#### Revolute A Finisher

The Paragon-Revolute Corp., 77 South Ave., Rochester 4, N. Y., announces a machine for processing ammonia type diazo whiteprints, to be known as the Revolute A Finisher. A unique method is provided in the machine for bringing the sensitized paper in contact with the ammonia paper. The ammonia vapor is generated inside a stainless steel tank, in the top of which are mounted six perforated stainless steel rollers. A Neoprene belt moves in contact with the edges of the tank, thus sealing it. The perforated rollers are mounted with their axes at right angles to the direction of the belt travel so that the belt and rollers cooperate to advance the sensitized material past the open portion of the tank.

Ammonia is metered and delivered to the evaporating tray by a diaphragm pump, the stroke of which can be adjusted to suit the requirement of different materials. The rate of feed is adjustable by means of a knob on the control panel, and the quantity of ammonia delivered in a given period of time is indicated on a

dial under the adjusting knob.

Upon entering the developing chamber, the ammonia is preheated to assure rapid vaporization and uniform development

# **WICACO** Precision Internal Grinder

for Toolroom and Production

A necessity in the toolroom, this machine also operates profitably on long production runs, working extremely close tolerances. Model illustrated has motor generator (Extra equipment for DC operation).

Wicaco Grinders are substantially built and have been in use over a long period of time. Fea-tures include rigid work-head; automatic carriage reverse; vibrationless underslung drive.

Write for complete details.

The Wicaco Machine Corp.

Stenton Ave. and Louden St. Philadelphia 44, Pa.

Est. 1868



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Revolute A Finisher

across the full width of the machine. Heat for vaporizing the ammonia is controlled by means of an interval timer. A thermometer is provided for determining the temperature of the vaporizing mechanism.

The Revolute A Finisher has a fixed speed of 15 feet per minute, however, where fast materials are to be handled continuously, the machine can be adjusted to provide a higher speed rate. The drive is powered by a ¼ h.p. motor operating through a gear reduction box. The diaphragm ammonia pump is connected directly to the drive and is synchronized with the conveyor belt speed.

A single switch is used in starting and stopping the machine. Rapid warm-up is obtained with the aid of auxiliary heaters which cut off automatically when the proper operating temperature is reached. Ventilation in the machine is provided by a ¼ h.p. motor and squirrel cage blower which operates independently of the drive mechanism.

Exposed prints are fed into the machine right side up. After development, they are deposited in a tray which is so constructed that prints up to 12 inches wide on the narrow dimension are automatically stacked face down. Thus, when the pile is removed and turned over, the prints are in order with the first print fed face up on the top of the pile. The stacker tray is hinged so that it can easily be swung back to provide a larger print catcher for large prints.

Sturdily constructed and finished in a gray wrinkle, the Revolute A Finisher is available in 42 and 54-inch paper with capacities for the proper developing of all known ammonia materials. The machine can be furnished for 220 volts, 50 or 60-cycle alternating current.

#### Mealpack Model 40 Mobile Canteen

Identified as the Model 40, a compact mobile canteen for quickly dispensing complete meals or snacktype lunches for 40 to 100 persons is announced by the Mealpack Corporation of America, 152 W. 42nd St., New York, N. Y. Complete full-course hot meals for 40 persons can be served from the unit, or a combination of 40 hot meals and 60 light lunches can be delivered and served.

The Mealpack Model 40 Mobile Canteen can be used for serving hot meals or light lunches to small or large groups in industries, offices, schools, railroad coaches, airplanes, and so on. Forty individual hot (or chilled) meals, including desserts, bread, cutlery, and napkins, are packed in stainless steel insulated containers which are said to keep each individual





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meal hot for two to three hours after preparation. Beverages or soups are kept not (or chilled) in 8 two-quart stainless teel bottles. A removable center compartment provides a convenient shelf, train board, and storage space for sandwiches, packaged salads, and deserts, hus enabling 60 light lunches to be erved in addition to the 40 hot meals packaged in the containers. The center

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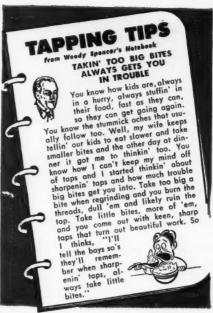
Mealpack Model 40 Mobile Canteen

compartment of the unit can be used optionally as a cold box for ice cream, bottled beverages, and other chilled foods.

Durable lightweight aluminum alloy construction with rubber-tired casters and anti-friction bearings allows for easy handling of the canteen indoors and outdoors. The streamline design (42 inches long x 22 inches wide) permits its use in narrow aisles, hallways, and elevators. All parts of the units are readily accessible for proper cleaning and easy maintenance.

#### **Kindt-Collins Melting Pot**

A melting pot of 50-lb. capacity for aluminum, white metal, zinc, and so on, has been announced by The Kindt-Collins Co., 12651 Elmwood Avenue, Cleveland 11, Ohio. According to the manu-



Woody Spencer's Tapping Tips aren't intended to be engineering advice on tapping problems. They're just the results of a lot of experience and some ideas gathered from the boys in the shops and if they make a few tapping jobs run smoother and quicker, we think they're well worth while

The real tapping problems that call for trained engineering and technical advice are something else. When you run into them, let our engineers help you. Send us complete information on the job—material, diameter of hole, depth of thread, whether it's through or blind, type of tap, lubricant used and all the information you think we should have. Our tap engineers will be glad to give you definite technical suggestions concerning your problems. No obligation, of course.

NOTE: Woody Spencer's Tapping Tips will appear here as often as Woody gets time to write them up. Look for them.

Woody Spencer's Handy Tap guide is packed with useful information on tapping. It's free. Write for your copy on the Company letterhead.

THE RIGHT TAP AT THE RIGHT TIME.

The West of Spencer Company



Kindt-Collins Melting Pot

facturer, the pot is scientifically designed and heavily constructed and is normalized to prevent cracking.

To provide for maximum life, the pot is cast from a special alloy which, it is claimed, allows for up to 200 heats under reasonable care. The use of a two-man

bale permits pouring of metal from the same pot in which it is melted, thus minimizing agitation, reducing porosity, and assuring high quality castings.

#### Page Ni-Cast Shielded Arc Electrode

Designed to produce machinable welds on cast iron, a shielded arc electrode designated as the Page Ni-Cast has been announced by the Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa. According to the manufacturer, the soft weld material deposited by the electrode bonds ideally with all grades of cast iron, thus making it excellent for repairing broken or worn castings and casting defects, or for correcting errors made in machining. After machining or grinding, the weld metal deposit is said to closely match the color of the cast iron parent metal.

The special nickel core wire, which has a nickel content of over 99 per cent, is provided with a coating that is free of ingredients which generate injurious gases, it is claimed. The electrode is described as having a very quiet, stable arc free from spatter and with a minimum of penetration and heating of the cast

#### THE NEW AIR-OPERATED

#### ALLEN DIAL FEED TABLE

For Use with PUNCH PRESS, DRILL PRESS, PRODUCTION MILLER, SPOT WELDER, ETC. Recommended for assembling, punching, machining of nuts, stampings, etc.

List\*

List\*

MODEL A-A 3-way valve, actuated by some motion from the machine to which the table is to be synchronized, allows compressed air to move a hardened and lapped piston to operate the Pawl arm. The Pawl indexes the plate and LOCKS it in the indexed position until the valve is released allowing a spring to return the Pawl, ready for the next indexing.

MODEL B-This model is an adaptation of Model A wherein a special control valve is incorporated so that the plate is automatically self-indexing. By merely turning a screw, speed is adjustable from one indexing each half second to one each ten seconds. The table is locked in position between indexings. Recommended for soldering, assembly, etc., operations where no mechanical motion is available.

\*F.O.B. Brooklyn, New York

A. K. ALLEN CO. (AIR DIVISION)



#### SPECIFICATIONS

Dia. of Index Plate-71/4". Height from base to top of Index Plate—218". Standard 12-position Index Plate. All working parts hardened.

> Write for Literature Inquiries invited from Air **Equipment Dealers**

3011 FT. HAMILTON PARKWAY BROOKLYN 18, N. Y.

342

iron. The weld metal deposit is claimed to be sound, homogeneous, and free from porosity on all grades of cast iron, while the fusion zone of the casting is free from hard zones of white iron. The weld metal is said to be free from cracks or cross checks when multiple passes are used in the repair or fabrication of cast iron parts. Welds are also claimed to be free of leaks on castings subject to hydrostatic pressures without using any special welding techniques or processes. The deposit and fusion zone of the cast iron may be easily machined, ground, or filed.

The Page Ni-Cast Shielded Arc Electrode can be used with alternating current or with either polarity direct current. It is manufactured in \$\frac{1}{2}\$, \$\frac{1}{2}\$, \$\frac{1}{2}\$, \$\frac{1}{2}\$, and \$\frac{1}{2}\$-inch diameters and is supplied packed in

10-lb. cartons.

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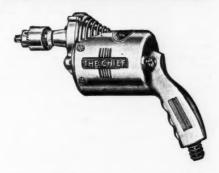
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#### "The Chief" Model 63 Portable Electric Drill

A portable electric drill weighing 3% lb., to be known as "The Chief" Model 63, is announced by the Chicago Precision Machine Co., 920 S. Michigan Ave., Chicago 5, Ill. According to the manu-

facturer, the lightweight balanced construction of the tool minimizes operator fatigue and simplifies ease of handling.



"The Chief" Model 63 Portable Electric Drill

Compact in design and versatile in application, The Chief Model 63 Portable Electric Drill is said to be ideally suited for general duty use on a wide range of production, maintenance, and repair jobs. Designed to drill holes up to ¼ inch in steel, the tool is supplied complete

# MILL IT... ON YOUR LATHE!

#### MILLING ATTACHMENT

Now you can Mill, Slot, Grind, Groove, Square Shafts, Saw at Angles. Recess and many other important jobs. SAVE TIME and MONEY! Why send work out or use costly methods when a PALMGREN MILLING ATTACHMENT will solve your problem.

Precision built, it has accurate graduations for rotary angle adjustments, also graduated vertical feed screw. Fits South Bend, Atlas, Craftsman, Logan, Sheldon and all other lathes. Thousands now in use in small and large machine shops, repair shops, railroads, schools, home work shops, etc. ORDER SIZE NEEDED TODAY!—it will quickly pay for itself.

CONVERTS LATHE

IMMEDIATE	Hes.	Jaws	Depth Jaws	jaws Open	Weight Pounds	Fits Tool Post	Price F.S.B. Factory
DELIVERY	150 250 400	11/4" 21/4" 4"	17.	1 5/8° 21/2° 4	61/2 11 25	1" Dia. 1¼" Dia. 2" Dia.	

Order From Your Dealer or Jobber: Write for Circular No. 351

SIZES \$1875

#### CHICAGO TOOL AND ENGINEERING CO

B399 SOUTH CHICAGO AVE. CHICAGO ITILLINOIS

with a three-jaw Jacobs chuck with key; easy-reach finger-point switch; comfortable pistol grip; and 12 feet of rubber cable. The unit has a free speed of 2,000 revolutions per minute and is constructed for operation on 110 volts, alternating or direct current.

alloy which is said to make possible the penetration of hardened steel without impairing the metallurgical properties of the metal. Only the metal removed during drilling is softened, the surrounding metal remaining unaffected. According to the manufacturer, the tensile strength of the drill is more than 45,000 p.s.i., and the drill is available in all standard and special sizes.

#### **Enesay Drill**

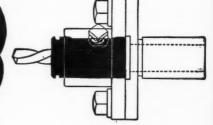
The Enesay Tool Co., 2240 Sepulveda Blvd., Los Angeles 23, Calif., announces the development of a practically breakproof drill which is said to cut through intensely hard and very soft metals with equal facility. It can be readily used in drilling through steel hardened to 68 Rockwell C and is claimed to frequently eliminate the need for internal grinding, since it is designed for precision drilling and reaming to extremely close tolerance limits.

The Enesay Drill is constructed of an

#### Freyman Concave-Convex Turning Tool

A small, handy, time-saving tool for making concave and convex turnings on low-quantity jobs is now being introduced by J. E. Freyman & Sons, 3627 Keswick Rd., Baltimore 11, Md. The tool consists of a cast iron frame, concave turning arm, convex turning arm, T-slot block, split-nut and handle assembly, and tool bit holders. All steel parts are case hardened and rust-proofed.

### ACRO-GRIP ADAPTER BUSHINGS SAVE TIME FOR SCREW MACHINE SET-UPS



Now available for all types of tool holders and turrets. Tremendous gripping power

prevents drill slippage—extreme accuracy and parallelism assured. Sold in sets or individually as low as \$1.25 each.

**Brown & Sharpe** Set Prices

Set No.	Holder Number	busning Size		Range of	No. of	Net Price
		Dia.	Length	Set in 64ths		with Case
SB-103	00 AC 10-A	1/2	3/4	To to To	17	\$20.00
SB-105	11A 20 BA	3/8	18	18 to 7	25	\$31.00
SB-106	12B-14 22B	1	11/4	1/4 to 3/4	33	\$54.30

WRITE FOR FOLDER

C. CLATFELTER COMPANY 20.

# SANFORD

# SURFACE

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d. n-

or

Model MG

Handles many odd size tool room and production jobs, due to its capacity of 8" x 12" x 12". Actual movements — Transverse 83/8" — Longitudina 13" — Vertical 12" (under 7" heel).



#### BENCH SURFACE GRINDER

Mode & G

A sensitive, highly accurate makine specially designed "for the job the fits in your palm."

Actual movements — Transvers 4" — ngitudinal 8" — Vertical (under

WRITE FOR COMPLETE DETAILS

SANFORD MANUFACTURING CO.

1021 COMMERCE AVENUE
UNION



### **ACCURATE ENGRAVING**with Unskilled Operators

Engraves an area 5 by 5 inches on curved surfaces without special templates, with smooth lines in any design, number, letter; on iron, brass, copper, aluminum, soft steels and all plastics. • Drills a series of holes • Profiles small parts • Increases accuracy and production • Works from original drawing or templates • Etches glass and similar items • Will not cause distortion. For information and prices write Dept. M.

#### AUTO-ENGRAVER COMPANY 1776 Broadway, New York, N. Y.



This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood. 4x361/4" band. The ideal portable unit.

OTHER STYLES AND SIZES IN NEW MANUAL ON FINISHING—WRITE TODAY

WALLS SALES CORP.



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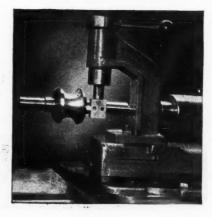
Freyman Concave-Convex Turning Tool with convex arm in place

The distance from the frame to the center of the spindle is stamped on the frame. The tool bit holders are adjustable up and down to suit the size of the lathe on which the unit is installed. A spacer may be placed under the foot of the frame to enable the tool to be used on large type lathes.

The Freyman Concave-Convex Turning Tool is made in two sizes. The No. 1 tool (which utilizes a ¼-inch tool bit) is intended for use on 9 to 14-inch lathes. The No. 2 tool (which utilizes a ¾-inch

tool bit) is intended for use on 16 to 36-

Freyman Concave-Convex Turning Tool with concave turning arm in place



inch lathes. The height of the No. 1 tool from the top of the split nut to the bottom of the frame is 7 inches. The height of the No. 2 tool is 10 inches.

With the No. 1 tool, the concave turning range is from ½ to 1½-inch radius and the convex turning range is from ½ to ½-inch radius. With the No. 2 tool, the concave turning range is from ¾ to 3-inch radius and the convex turning range is from ½ to 1-inch radius.

#### Sellew Type "K" Two-Spindle Drill Head

Designated as the Type "K," a full ball bearing two-spindle drill head with spiral



Sellew Type "K"
Two-Spindle
Drill Head

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gears completely enclosed for smooth operation is now being marketed by the Sellew Machine Tool Company, Pawtucket, Island. drill head is supplied complete with 4-inch capacity chucks and has a minimum adjustment between spindles of 1% inches and a maximum adjustment of 3% inches. The use of Trump chucks is said to provide for a minimum adjustment between spindles of 11/4 inches and a maximum adjustment of 3% inches. The housing and carriers of the Drill Head are constructed of aluminum.

According to the manufacturer, the Sellew Type K Two-Spindle Drill Head can be used to advantage on either bench or floor type drilling machines.

#### Matco Form Dresser

Precision radius dressing is said to be easily and accurately attained by the use of the grinding wheel dresser illustrated herewith, product of the Matco Tool Co., 2830 W. Lake St., Chicago 12, Ill. Mounted on a cutter or surface grinder, the device is said to handle any form of radius dressing, concave or convex up to 1-inch circle, and is designed to dress up to a 10-inch O.D. wheel. With column tilted, the radius can be greatly increased.

According to the manufacturer, the



#### FLASH Bandsaw Welder

Beats brazing and butt-welding. Cuts set-up costs. Welds, forges and anneals up to %". 6-Point heat controls. 110 and 220 v. models.





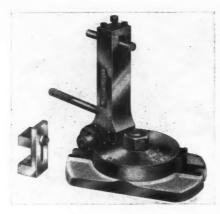
#### **COMPACT** Spotwelder

Engineered for light gauge production spot welding. 3 KVA, capacity 18 gauge. Air operated, electronically timed, water-cooled. Only 21" high.

Weldex Inc.

7327 McDONALD

DETROIT TO, MICH



Matco Form Dresser

Matco Form Dresser can be quickly and easily set up to dress any close tolerance radii. A micro-precision setting attachment is said to add to the precise and infinite accuracy obtainable with the device, which is sturdily constructed and can be supplied in special column lengths for internal grinding wheel dressing.

#### **Alox 427 Organic Mixture**

Alox 427, a mixture of oxygenated hydrocarbons derived from petroleums, is now being offered by the Alox Corp., 3936 Buffalo Ave., Niagara Falls, N. Y. The reaction products of Alox 427 and cyclohexylamine or triethanolamine are claimed to be excellent water soluble rust inhibitors. As little as 0.25 per cent in water is said to protect steel immersed in the solution.

A solution of the amine soaps of Alox 427 in water provides an effective and convenient medium for the storage of small machined metal parts for periods of several months or longer. When the metal is removed from the solution, an extremely thin, almost invisible film is still present on the surfaces which is said to protect the metal for a day or two

from atmospheric corrosion.

A complete emulsifiable base consisting of soda soaps of Alox 427, a stabilizing agent, and oil is available for metalcutting fluids and coolants. This product, known as Alox 438, is said to be useful in the control of corrosion during the fabrication of corrodible metals. It can be used in the fabrication of ball and roller bearing parts, especially in the process of lapping races where the control of cor-

### MAXIMUM PRODUCTION IN CHUCKING AND INDEXING

With the new Dearborn Automatic Indexer connected to a Dearborn Chucking Fixture: chuck is closed automatically; indexed the required number of times automatically: chuck is opened automatically; piece is knocked out automatically.



Write for further information.

When used with the Dearborn Degree Indexing Fixture it can quickly be set to index any number of degrees from 30° to 90° at one indexing and then knock out, or it can be set to index from no degrees to 90° and then not knock out.

W. DEARBORN

Ansonia, Conn.

cosion is essential. Optimum results in corrosion prevention are claimed to be betained when Alox 438 is diluted one part to six parts of water.

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Morpholine soaps of Alox 427 are said o readily form excellent emulsions for see in coating damp metal. The moderate volatility of morpholine causes it to evaprate gradually from the drying emulsion ilm, leaving the film resistant to moist tmospheric exposure.

#### **Tumico Tubular Micrometer**

Featuring a tubular structure that is said to improve measuring accuracy, a micrometer designated as the Tumico is now being manufactured by the Tubular Micrometer Co., St. James, Minn. Additional features of the micrometer include a wear take-up spindle bushing assembly to compensate for wear at the frame. The micrometer has three points of take-up, these being on the spindle, at the tip, and on the thread. According to the manufacturer, the upper and lower wear nuts on the tapered ground threads can be easily tightened so as to realign the micrometer spindle.

The threads of the Tumico Microme-



Tumico Tubular Micrometer

ter are ground from the solid to afford maximum accuracy to the instrument. Both the spindle and anvil are hardened to Rockwell 64-C to reduce wear. The spindle is lapped to a true fit with the barrel, thus ensuring trouble free operation and smooth action. Micrometer



47

graduations and numerals are large and easy to read.

Components of the hollow micrometer frame are made of high grade alloy steel having a stable homogenous grain structure. In addition, frame parts are electroplated with copper, nickel, and chrome, The heavy plated finish is said to eliminate rust and tarnish and effectively resist corrosion from perspiration. The hollow frame structure and triple plating tend to eliminate shock distortion if the micrometer is accidently dropped.

The Tumico Micrometer is furnished in a variety of types for numerous precision measuring requirements, including conventional type ranging in size from 0 to 24 inches; blade type in sizes from 0 to 4½ inches for measuring narrow depths; and roller mill type with a 3 or 6-inch throat depth. A bow type micrometer with interchangeable mandrels is manufactured in sizes from 0 to 96 inches.

Internal bores or openings ranging in size from 6 to 106 inches may be easily measured with Tumico Inside Tubular Micrometers. Also, to simplify internal bore measurements, an over-the-bar type tubular micrometer has been designed in sizes from 8 to 28 inches. Any of the various types of micrometers may be ob-

tained individually or in sets, depending upon the user's requirements. Or, they may be furnished with added features such as ratchet stops, ball bearing camaction lock rings, readings by ten-thousandths, and radius ground anvils.

#### Metron Comparator Gage

Of the electromagnetic type but utilizing no vacuum tubes or similar components, the Metron Comparator Gage ilustrated herewith is now being marketed by the Metron Instrument Co., 436 Lincoln St., Denver 9, Colo. The gage has four ranges of magnification (selected by means of range switches), thus making it suitable for a wide variety of applications from the checking of gage blocks to the production inspection of machined parts.

The Metron Comparator Gage is available in three models calibrated in either English or metric units. The Model 10 has a gaging range from 1 millionth inch to 4 ten-thousandths inch. The Model 20 has a range from 10 millionths inch to 5 thousandths inch. The Model 30 has a range from ½ ten-thousandth inch to 20 thousandths inch.

A HUNDRED and ONE SPEEDS
INSTANTLY AVAILABLE
WHILE MACHINE IS RUNNING

The exact speed required for
drill diameter and material at
the turn of a knob.

Exact control of speeds means
less breakage, fewer grinds,
higher efficiency.

TWO MODELS — 1-6 spindles
M-125 3/8 Cap. (illustrated)
M-96 7/8 Cap.

WRITE FOR BULLETIN DESCRIBING BOTH MACHINES

THE TAYLOR & FENN CO. HARTFORD 1, CONN.

350

The spindle pressure of the Metron Comparator Gage is adjustable and calibrated from 4 ounces to 2½ lb., and the head can be rotated at any angle about the column or in a vertical plane for wide application. If desired, the head can be removed for special setups. The gage includes only two moving parts; namely, the spindle, which is supported in flexure, and the pointer, which is mounted on jewel pivots. A complete line of accessories, such as large anvils, stops, flat tips,

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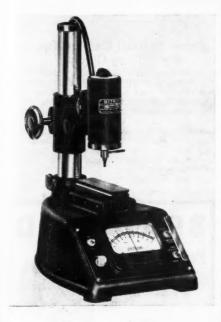
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Metron Comparator Gage

overhang supports, and V-anvils, are available for the gage for use in the accurate measurement of parts of all shapes and materials.

#### Aircraft Tools Spring Tension Clamp

Specially designed for quick application, a spring tension clamp for plastic or metal fabrication, template, layout, and other jobs where uniform pressure and speed in applying and releasing holding mechanisms are essential has been developed by Aircraft Tools, Inc.,



### ZINC and ALUMINUM DIE CASTINGS

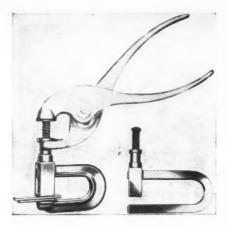
UP TO 2 LBS. IN SIZE

Let us furnish you with full information regarding our up to the minute service on die castings which are outstanding in quality and unsurpassed in accuracy. Write today.

# Yoder

DIE CASTINGS, INC.

631 WAYNE AVE., • DAYTON, OHIO



Aircraft Tools Spring Tension Clamp

2306 E. 38th St., Los Angeles 11, Calif. Applicable with either a pliers or gun, the clamp is claimed to feature uniformity of pressure. With a special steel spring, the clamp may be adjusted to obtain a pressure up to 70 lb.; a pressure

up to 100 lb. may be obtained by the use of a special spring.

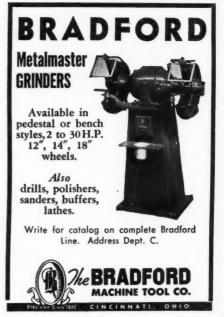
The Aircraft Tools Spring Tension Clamp is available in three standard sizes and may be obtained in special dimensions to fit job requirements. The smallest of the standard size clamps has a sturdy Zamak yoke which is said to withstand pressures well over 500 lb. It may also be obtained with a steel yoke which is standard with the other two sizes. All parts of the clamp are readily replaceable.

#### Super Bi-Axial Carbide-Tipped Milling Cutter

A bi-axial carbide-tipped milling cutter for slotting steel has been developed by the Super Tool Co., 21650 Hoover Rd., Detroit 13, Mich. According to the manufacturer, two axial rake angles and negative rake on the blade provide for automatic centering and the absence of flutter, thus eliminating side wear and making possible the holding of close tolerances, as well as increasing the number of cuts per grind.

A job is submitted as typical of the





jobs which can now be handled by carbide: work, transmission shaft, Rockwell 38-40 on "A" scale; three slots to be milled to 1-inch depth x 0.850-inch width x 3-inch length.

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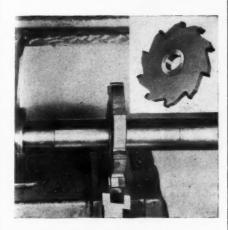
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Width it o mon tongs	Previous Tool Bi-	
Feed	34" 11	"
Speed	425 r	.p.m.
Pieces per grind	120 24	0
H. P		,
Result: Three machi		b.



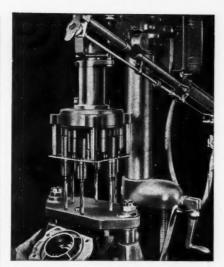
Super Bi-Axial Carbide-Tipped Cutter being used to mill a slot to the exact size with perpendicular walls and sharp corners in a section of tool steel

A catalog illustrating the Super Bi-Axial Carbide-Tipped Milling Cutter and specifying standard sizes in which it is now being stocked is available from the company.

#### "Cent-A-Matic" Machine Tool Center

Designed for placement in the headscriber, a precision machine tool center to be known as the "Cent-A-Matic" is now being marketed by the Acme-Danneman Co., Inc., 203-205 Lafayette St., New York 12, N. Y. The unit is available in two models; namely, Model 10 for engine and bench lathes and Model 20 for cylindrical grinders.

Designed to eliminate the use of a lathe dog, the Cent-A-Matic Model 10 is said to allow for the production of dupli-



### Precision Set-Ups That "Stay Put" for

HIGH VOLUME, MULTIPLE DRILLING AND TAPPING

The Quick-Change Adjustable, Multiple Drill Head is designed for long-run, multiple drilling and tapping operations. Illustration shows six holes for a bolt circle being drilled in a cast iron bearing plate. Six different bearing plates are drilled with this head at Wisconsin Motor Corp.

Each bolt circle pattern has its own set of spindle positioning plates. Spindle locked into position; cannot shift. Each spindle can be located anywhere within a 3¾" circle, and all circles overlap.

Standard models available with 2 to 6 spindles. Models with more than six spindles built to order.

Write for Illustrated Bulletin

STRUTZ & MEAD, Inc.
DISTRIBUTORS FOR
WISCONSIN DRILL HEAD CO.

1227 N. Water Street, Milwaukee 2, Wisconsin



## PEERLESS ABRASIVE BELT SURFACER

Speed and quality in grinding flat surfaces of metal, wood, hard rubber, celluloid and plastics. Obtainable in both vertical and horizontal types—9", 14", 20" sizes.

Send for illustrated pamphlet.

#### PRODUCTION MACHINE CO.

GREENFIELD

MASS.



**PRECISION** 

ACCURACY

### **Woodruff Keys**



Machine Keys Taper Pins Machine Racks Straight Pins

Cotter Pins and Other "Stanho" Steel Products.

#### S T A N D A R D HORSE NAIL CORP.

NEW BRIGHTON Since 1872 PENNA

cate lathe turned parts having a variation of as much as A inch depth of centering drill. Duplicate mold parts having



"Cent-A-Matic" Machine Tool Center

shoulders can be accurately machined with this model.

The Cent-A-Matic Model 20 is designed expressly for grinding diameters to shoulders, with center drill depths varying as much as & inch.

#### "L-CO" Industrial Matting

Designated as the "L-CO," a rubberlink floor matting for industrial use is now being introduced by the Lowenthal Co., 188 W. Randolph St., Chicago, Ill. The matting is particularly recommend-

"L-CO" Industrial Matting



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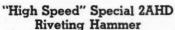
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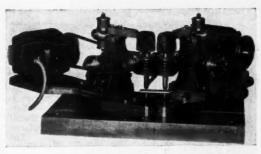
ed for the use of workers performing a major part of their duties in a standing position.

Virtually indestructible, skidproof, and shock-absorbing, the L-CO Floor Matting is available by the square foot in any size to meet the user's specifications. It

can be custom fitted to odd shaped rooms and is available in special purpose mats for work areas or as a wall-to-wall floor covering.



Designated as the 2AHD, a bench type riveting hammer having twin heads



for the cold forming of two rivet heads simultaneously has been developed by The High Speed Hammer Co., Inc., 307 Norton St., Rochester 5, N. Y. The unit has a capacity for ½ to ½-inch diameter rivets. Units with greater capacities are also available.

The "High Speed" Special 2AHD Riveting Hammer has a minimum center line distance of 2% inches and a maximum center line distance of 12 inches. Greater center line distances can be obtained on order if required.



Working with carbide or high speed steel cutting tools? Need live centers that will stand up under continuous operation and maintain more accurate, faster output?

If so, you'll want these new, free Bulletins in your file for ready reference to RED-E New Departure Ball Bearing CENTERS. Detailed descriptive material, valuable engineering data . . . complete information to aid in selecting precision centers to meet your precision machining requirements.

Copies of Bulletins 471 and 472 will be mailed promptly on request. Write—Department MM.

**CENTER Specialists Since 1908** 



THE READY TOOL COMPANY 550 Iranistan Ave., Bridgeport 5, Conn.

### Thermoid Lightweight Industrial Wheel

Available in sizes from 6 to 12 inches and in load ratings from 480 to 1,200 lb., an industrial wheel made of a tough,



Thermoid Lightweight Industrial Wheel

lightweight, aluminum alloy casting with oversize ball bearings and builtin grease seals is now being offered by the Thermoid Co., Trenton 6, N. J. The design of the wheel also includes a large grease reservoir equipped with a standard grease gun fitting. The rubber tread of the wheel is described as smooth, cut resistant, and quiet in operation.

The Thermoid Lightweight Industrial Wheel is supplied in diameters of 6, 8, 9, 10, and 12 inches in a full range of hub lengths and axle sizes.

#### S. and A. Dowel Pins

The Schultz & Anderson Co., 111 Edison Pl., Newark 5, N. J., is now marketing dowel pins in a variety of sizes which are intended to cover the range generally in use. The pins have an extremely hard surface and are precision ground to exceedingly close tolerance limits. The core is said to be of sufficient hardness to overcome any tendency to "mushroom" when a pin is driven into a tight hole. Tensile strength is from 240,000 to 250,000 lb. per square inch.

The pins are made in 162 standard sizes from % inch to 1 inch diameter and from % inch to 6 inches in length. A chart is available which lists the sizes and dimensional data, with the list prices.

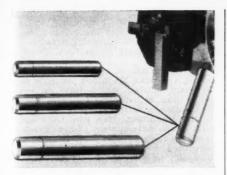
#### Boyar-Schultz Revolving Stop

Featuring a free-turning ball bearing head that is said to reduce friction between the work and stop, thus preventing marring of piece parts, a revolving stop for screw machines is announced by the Boyar-Schultz Corp., 2110 Walnut St., Chicago 12, Ill. Due to its design and precision manufacture, the stop is said to



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Boyar-Schultz Revolving Stops

help eliminate variation in piece-part lengths. Moreover, its enclosed ball bearing races are claimed to prevent entrance of chips and foreign material, thus assuring long stop life.

Made from quality materials and hardened to withstand long continued abuse, the Boyar-Schultz Revolving Stop is furnished in three sizes and seven lengths.

#### Congress 11 and 16-Inch Pulleys

The Congress Die Casting Division, 3750 E. Outer Dr., Detroit 12, Mich., announces that it is now in production on 11 and 16-inch pulleys, thus affording the company a complete line of pulleys from 1½ to 16 inches in diameter. In addition,



Congress Pulley

the company has available complete lines of step-cone pulleys, variable speed pulleys, and flexible couplings.



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#### New Books

60 Years with Men and Machines. By Fred H. Colvin. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. 300 pages, 78 illustrations. Cloth binding, board covers. Price \$3.50.

This book, written by a man who has spent some 63 years in or connected with the metal-manufacturing industry will strike a responsive and nostaglic chord in the memories of metal goods manufacturers, machine tool builders, machine shop executives and old-time machinists.

The author, Fred Colvin, is a true pioneer of the modern industrial revolution. He has spent a lifetime in the field of machinery, serving first as an apprentice and then as a journeyman machinist, later becoming staff editor and finally co-editor of the "American Machinist." During these 63 years or so the author had an opportunity to follow the evolution of trade practices within the industry and his book is an absorbing, and oftimes highly amusing, account of the world of invention, machinery and production from 1884 to the present day. He has known intimately many of the great

inventors, scientists, engineers and industrialists; and has made hundreds of friends among the operating personnel of American machine shops from Coast to Coast.

Mr. Colvin served on the editorial staff of the American Machinist for more than 30 years, during which time he wrote more than 40 technical books. Although now formally retired, he still contributes to the Machinest. Men who have had a part in the development of machinery or machine tools or who have been closely identified with this great industry will find Mr. Colvin's book absorbing.

Jigs and Fixtures for Mass Production. By Leland A. Bryant and Thomas A. Dickinson. Published by Pitman Publishing Corp., 2 W. 45th St., New York 19, N. Y. 222 pages. 160 illustrations. Cloth binding, board covers. Price, \$3.50.

for TFAC

This book provides comprehensive and authoritative information on those manufacturing tools that are collectively known as jigs and fixtures and used in manufacturing virtually all products. It thoroughly covers the subject of plastics, pneumatics, and hydraulics as applied to



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These strong, sturdy "Hallowell" Work-Benches of Steel with flared feet, stand firm and rigid without costly bolting to the floor; withstand constant use and abuse year in and year out. They have interchangeable sections... are made in five heights and widths, and in seven standard lengths. Can be moved easily and joined end to end to form a continuous work-bench of any length. Try to do this with wooden benches and all you have left is a pile of kindling wood, bristling with bent nails. Write for the "Hallowell" Catalog and prices which are very attractive.

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tooling, and considers all the most important wartime developments in the field of industrial tooling, such as the

Master Tooling Dock.

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The book is simply written and well illustrated so that it can be understood by the plant manager or executive concerned with functional problems, as well as by the trained and experienced tool engineer. It traces the history of the subject and shows how it is related to industry as a whole, not just to the machine shop. The designing and construction of jigs and fixtures, the various types, and tooling procedures are all fully discussed. Particular attention is given to assembly tooling on which large-scale production so largely depends.

The contents of the book are divided into ten chapters which are headed as follows: The Need for Jigs and Fixtures; Tooling Procedures; Designing Jigs and Fixtures; Types of Jigs and Fixtures; Master Tools; Master Tooling Dock; Construction of Jigs and Fixtures; Pneumatic and Hydraulic Mechanisms; Plastics; and Miscellaneous Jigs and Fixtures. The book also includes a glossary,

appendix, and index.

According to the publisher, tool and mechanical engineers, shop superintendents, plant managers, and manufacturing executives will find the book of lasting value, the volume also being suitable for use as a reference text in manufacturing and engineering courses.

Control Charts in Factory Management. By William B. Rice. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 149 pages. 33 tables and charts. Cloth binding, board covers. Price, \$2.50.

In this volume, emphasis is placed on the usefulness of statistical control to factory executives, foremen, and inspectors. The book provides the theory and formulas necessary for the sound use of control charts, and contains a wealth of practical illustrations. A unique feature is the group of case histories, in which principles are illustrated by examples taken from actual experience.

In addition to an introduction entitled "Statistical Quality Control: What It Is and What It Does," the book contains six chapters which are headed as follows: The Role of Inspection; Statistical Control; x and R Charts; p and pn Charts; Case Histories of Control Charts; and Organization of a Statistical-Quality-Control Program. The book also contains a complete index at the rear.

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Electronics for Industry. By W. I. Bendz. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. N. Y. 501 pages. Illustrated. Cloth binding,

board covers. Price, \$5.00.

For engineers desiring an understanding of the fundamentals of electronics, this book affords a practical, non-mathematical work dealing with the industrial applications of electronic control circuits, power rectification and induction, and high-frequency dielectric heating. Written by a Westinghouse Electric Corporation engineer, the book outlines the functions of all kinds of electronic tubes and

provides a workable background of the basic circuits frequently used with industrial devices.

The contents of the book are divided into 17 chapters which are headed as follows: Meet the Electron; Electron Es cape from Solids-Emission; Electricity from Light; Electricity into Light; Two-Element Tubes; Three-Element Plio-Element Tubes; Three-Element Pliotrons; Multigrid Pliotrons; Thyratrons From Alternating to Direct Current: Tubes: Amplification: Mercury-Pool Principles of Oscillation; Modulation and Detection of Carrier Waves; Heating by High Frequency; Basic Circuits of Electronic Control; Industrial Application of Electronic Control; and Electronic Regulators. An appendix and index are included at the rear of the book, which is designed principally for engineers whose training with power equipment is directed toward electronic apparatus.



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HALL MANUFACTURING COMPANY 622 Tularosa Drive • Los Angeles 26, Calif. Measuring and Rating Employee Value. By John B. Probst. Published by The Ronald Press Co., 15 E. 26th St., New York, N. Y. 166 pages. 67 figures. Cloth binding, board covers. Price, \$5.00. P

This volume is designed to meet the needs of those who are in search of thoroughly organized and time-tested methods for correctly rating the personnel capabilties and work performances of their individual employees. The book sets forth the results of the author's basic research and experimentation and his work in installing and operating the plans explained during a long experience as pesonnel director and consultant in personnel relations. It first discusses briefly the traditional methods of employee rating to point out what are considered to be their inherent defects and causes of their faiuure. It next develops the setting up of the characteristics fundamental to the proper measurements and rating of



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employee value, explaining these characteristics and the manner in which they are individually measured so they may be orrectly scored in the rating plan.

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The different report forms devised for se with the procedures described cover occupations in the fields of public adminstration, the professions, skilled labor, inskilled labor, inspection, sales, clerical work, and education. The rating plan herefore can be directly applied by personnel directors, public administrators, executives, and supervisors in business or industrial organizations, and by others called upon to rate persons working under their direction, or to set up methods for the purpose. Union executives and shop stewards will likewise find in this plan much of concern and value because of the importance of merit rating as a factor in mangement-labor relations.

The contents of the book are divided into three principal parts; namely, "Employee Rating Plans in General," "An Improved Rating System," and "The System in Practice." A total of 12 chapters are included in these parts, the chapter headings being as follows: "Ratings and Their Purpose; Types of Rating Plans; A Critical Analysis of Rating Plans; The Need for a Better Rating Plan;

Development of a More Effective Rating System; The Probst System in Operation; Testing a Rating System; Statistical Analysis of Ratings; Special Experimental Tests of Rating Methods; Filling Supervisory and Key Positions; Measuring Personal Fitness; Unfinished Business.

In addition, the book contains a section of appendices which are entitled as follows: "Origin and Development of the Scoring Stencils and Formula Scales in the Probst Rating System"; "Item Selection"; "Los Angeles Statistical Chart and and Data"; "The Order of Layoff"; "Foreign Translations"; "Oral Interviews—Analysis of a Six-Year Study"; "An Analysis of Oral Interviews"; "An Experimental Test in England with the Probst Rating System"; and "Directions for Conducting an Experimental Test in Measuring the Worth of Employees." A complete index rounds out the book.

Elements of Mechanism (6th Edition) By Scwamb, Merrill, and James. Revised by Venton L. Doughtie. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 428 pages. Illustrated. Cloth binding, board covers, Price, \$4.00.

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Mr. Doughtie's revision of "Elements of Mechanism," the first edition of which was published over 40 years ago, brings this standard work thoroughly up to date while retaining throughout the original authors' time-tested approach to the fundamentals of mechanism, kinematics, and machine design. All chapters have been thoroughly revised.

The chapters on vectors, velocity, and acceleration have been rewritten to make these important subjects clearer. Theory is developed and given practical applications, thereby making the book more useful. Current terminology, notation, standards, illustrations, and examples are used throughout. Fundamentals are treated in the same manner as in earlier editions, however, the discussion is of present-day practice and standards. Many new problems have been added, and laboratory problems emphasizing practical applications are included for the first time.

The contents of the book are arranged as follows: Notation and Symbols; Introduction; Motion; Vectors; Velocity Analysis; Acceleration Analysis; Linkages; Transmission of Motion by Direct Contact; Cams; Bodies in Pure Rolling Contact; Gears and Gear Teeth; Wheels in Trains; Belts, Ropes, and Chains; Miscellaneous Mechanisms; Laboratory

Problems; and Index.

Applied Engineering Mechanics. By Alfred Jensen. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y. 316 pages. 478 figures. Cloth binding, board covers. Price, \$3.00.

In preparing this volume, which is designed to meet the minimum requirements of a beginning course in mathematics, the author has endeavored to make it suitable in content and approach both for students in engineering and architecture and for those in junior colleges and technical institutes. In developing the material, the author has been guided by more than 15 years of experience in teaching mathematics, both to college students and also, for a brief period, to technical institute students with varied and sometimes limited mathematical background.

The book is divided into two parts: Statics and Dynamics. In Statics, the problems most commonly occurring in practice have been given more than usual emphasis. Analytical and graphical solutions are presented side by side in order to show their close relationship and to encourage students to use them concurrently, checking one against the other. Throughout, mathematics has

been held to a minimum.

The contents of the book are divided



into 20 chapters, each composed of several articles. Each article then presents additional theory, a new concept, or a different aspect, and contains one or more completely solved examples illustrating its application. A number of problems follow, carefully arranged in order of difficulty and more than half of them supplied with answers. At the end of each chapter is a summary of its important points and formulas, thus affording students a quick review of its essential parts. The summary too is followed by a series of review problems, all with answers given, and by a number of review questions carefully arranged to test the student's grasp of subject matter.

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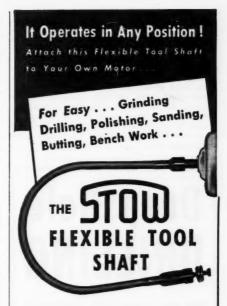
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Yarksticks of Management, Second edition. By Howard G. Benedict with a preface by Harlow S. Person. Published by Management Book Co., Inc., 814 Bartlett Bldg., Los Angeles 14, Calif. 175 pages, 81/2 x 11 inches. Full flat opening binding. Price postpaid with extra set of rating sheets, \$15.00 plus sales tax.

This outstanding handbook comprises a technique for furnishing to management engineers, top management, bankers, and department executives an evaluation and rating of the effectiveness of the management practices pursued in a company's operation throughout all departments and functions. It provides a numerical expression of the company's total attainment as well as of the rating of each of its activities as they affect the final accomplishment.

The book pointedly outlines specific procedures which it is essential to activate in bringing about high performance on vital operating methods to assure the profit increasing results of scientific management in action. "Yardsticks of Management" is said to be a valuable working tool for the management engineer in emphasizing to top management the necesstiy for adequate backing in his insistence on sound, forthright techniques (including supporting administrative policies) and then periodically measuring and rating the performance and results attained all along the line.

A handy, easily read volume in client's report size, the book is adequately indexed for quick reference to sub-factors under consideration. The contents are divided into nine principal chapters as follows: Introductory; The Factors of Good Management; Charts for Executive Utilization of Ratings; Rating Question-naire; Utilization of Factor Ratings; How Ratings Are Made; Rating Procedure; and Recognition of the Need for Ratings of Management Attainment.



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Bryant No. 109 Automatic Internal Grinder, particularly designed for the high production grinding of small and medium bores and suitable for such work as ball bearing races, gears, rolls, bushings, and other parts to be produced in large quantities, is fully described and illustrated as to construction features, specifications, and so on, in a four-page folder prepared by the Bryant Chucking Grinder Co., Springfield, Vt. Copy free upon request.

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South Bend 13-Inch Precision Lathes. An eight-page catalog published by the South Bend Lathe Works, 386 E. Madison St., South Bend 22, Ind., illustrates in full color and completely describes South Bend 13-Inch Swing Quick-Change Gear and Toolroom Lathes which feature quick-change gearboxes that make immediately available gear combinations for cutting 48 pitches of screw threads, right or left-hand, and 48 power longi-tudinal feeds and cross feeds. Attach-ments and accessories for the lathes are also shown.

Copy of Catalog No. 13-F is available free of charge to mechanical executives.

Crosman's "T" Surface Grinder for the quick and accurate grinding of tools, dies, and small machine parts is fully illustrated and described as to construction features, operating advantages, and so on, in a four-page folder published by J. B. Crosman & Son, Inc., East Walpole, Mass. A table of specifications of the grinder is provided on the back of the folder, which also includes a separate price list. Copy free upon request.

"Flexlink" Adjustable V-Belt is the subject of a 16-page bulletin announced by the Dodge Manufacturing Corp., Dept. MMS, Mishawaka, Ind. The bulletin provides illustrated and complete descriptive data on the construction, production advantages, and applications of the V-belt; complete information on how to install Flexlink drives, as well as special installation directions; data on the selection of Flexlink drives, including service factors; horsepower rating tables; comparative belt length table; and price list and shipping weight table. Copy of Bulletin A-202 free upon request.

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Adamas Cemented Carbide Price List and Catalog. The Adamas Carbide Corp., 1819 Broadway, New York 23, N. Y., announces a revised price list and catalog leaturing (1) the new standard styles, sizes, and tolerances for blanks recently adopted by the principal tungsten carbide manufacturers; (2) a simple method of computing prices on non-standard blanks; (3) standard and special grade designations, their applications Rockwell hardnesses; (4) new "in-stock" standards available; and (5) prices on cemented carbides. Copy of Adamas Cemented Carbide Price List and Catalog free upon request.

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ce of Hilliard Over-Running Clutch is featured in a folder issued by The Hilliard Corp., Elmira, N. Y. The folder depicts typical applications of over-running clutches and couplings and includes supplements which fully illustrate and discuss the construction and operating characteristics of various types of over-running clutches and couplings. Copy free upon request.

Dickerman Automatic Stock Reel. An illustrated bulletin now available from the H. E. Dickerman Manufacturing Co., 321 Albany St., Springfield, Mass., contains information on the features and general specifications of a stock reel which is designed to automatically unreel coiled strip stock at a controlled rate as required by the die being fed. Copy free upon request.

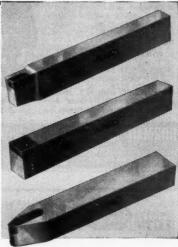
"Low Cost Deburring and Finishing with 'Honite' Abrasive Pebbles," a 12page illustrated bulletin of particular interest to manufacturers of cast, stamped, and machined metal parts which require a final deburring or finishing process, has been released by the Minnesota Mining & Mfg. Co., Advertising Dept., St. Paul 6, Minn. The booklet tells how costs on one typical operation on an aluminum die casting were reduced 90 per cent as compared with the same work by hand. Also included are illustrations and descriptions of the various types and sizes of Honite and tips on how each is best used. Copy free upon request.



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  The No. 2-A tapper drives from 3/8" to 3/8" and No. 3-A drives from 1/2" to 11/4" in any tapable material.

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DO BETTER TAPPING AND SAVE MONEY.

Price \$40.00 with M.T. Shank or \$45.00 with Adaptor for Male Spindle Drill Press.



"Basic Guide to Ferrous Metallurgy" is the title of an attractive plastic-laminated 16¼-inch wide x 21-inch long wall chart prepared by the Tempil Corp., 132 W. 22nd St., New York 11, N. Y. Printed in 19 colors, the chart is said to be of particular aid in the heat treating, processing, welding, and general fabrication of steels up to 0.9 per cent carbon.

steels up to 0.9 per cent carbon.

Designed for long life and easy cleaning, the chart shows the working characteristics of steels at temperatures from -300 deg. F. to 2,900 deg. F. All of the important temperature zones, including hot-working, annealing, normalizing, stress relieving, carburizing, and preheating for welding, are clearly defined. Temperature ranges are shown in 19 colors approximating the characteristic hot-body radiant hues. At the right-hand side of the chart 23 fundamental metallurgical terms are defined and explained. A diagram symbolizing the change in grain structure with temperature is shown at the left.

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Recommended as a handy reference source for the engineer, metallurgist, and skilled worker, the chart is available free to industrial executives addressing requests on their company letterheads and stating their position.

Multiple Unit Crucible Furnaces. A four-page illustrated bulletin announced by the Hevi Duty Electric Co., Milwaukee 1, Wis., contains complete information, including specifications and construction and operating details, on its multiple unit crucible furnaces especially designed for melting small quantities of base metals, for pyrometer calibration when the couples are immersed in molten salts or metals, and for heating all materials when contained in crucibles. Copy of Bulletin HD-1246 free.



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The United States Electrical Tool Co.,
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catalog which discusses the complete facilities of this firm for the production of
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Dowding & Doll Machine Tools. Dowding & Doll Ltd., Greycoat St., Westminster, London S. W. 1, England, now has available a catalog which provides illustrated, descriptive, and tabular information on a complete line of British-made machine tools and equipment, including "Accuratool" capstan lathes and thread milling hobs; "Ahcol" band grinding machines, nut slotting and rotary milling machines; D. & D. chaser holders and taper turning attachments; "Facks" external and universal bench type thread milling machines; Kemworthy plain cylindrical grinding machines; Matterson bevel and spur gear generating attachments and universal thread milling machines; Puckert pneumatic bar feeds; Westminster hand injection moulding machines; "Whizzer" automatic drilling machines; and "Wright" table surface grinding ma-

Conversion charts and technical data are provided at the rear of the catalog, copy of which is offered free to mechanical executives addressing requests on their company letterheads.

Oxyarc Process for the hand cutting or piercing of stainless and stainless clad, alloy steel, aluminum, bronzes and brasses, cast iron, Monel, Inconel, and nickel is fully described in a four-page attractively illustrated folder published by the Arcos Corp., 1515 Locust St., 444 Gulf Bldg., Philadelphia 2, Pa. Copy free upon request.

"Powder Metallurgy." The Keystone Carbon Co., St. Marys, Pa., has revised and enlarged its "Powder Metallurgy" catalog to include many new sizes of self-lubricating porous bronze bearings. The new sizes are for the company's plain bearings, flanged bearings, and self-aligning spherical-type bearings.

All information from the former catalog on both powdered metal bearings and powdered metal parts has been retained in the revised 48-page catalog, which features an interesting section devoted to the correct design of powdered metal

parts. Copy free.





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**Completely Ball-Bearinged** 

For precision machining operations, the Philbro Vertical Attachment will accurately, efficiently and speedily mill, bore and drill. Mounted in a jiffy, tilts to any angle, heavy over-size spindle, takes cutters and end mills up to  $\sqrt{2}^{\prime\prime}$ . Really takes heavy duty cuts.

PHILBRO TOOL & DIE CO. 1741 BROADWAY

Melin Tools. The Melin Tool Co., Inc., 1331 Phillips, S. W., Grand Rapids 7, Mich., now has available a catalog which, in addition to complete listings of sizes (up to 2 inches) and prices on 2, 3, and 4-flute standard end mills, includes complete data on center bores, counter drills, countersinks, rigid-grip tool bit holders, corner rounding cutters, diesinking cutters, router bits, and live centers. Moreover, the catalog contains many pages of helpful engineering reference data.

Copy is available free to mechanical executives addressing requests on their

company letterheads.

5401 Fountain Ave.



Los Angeles 27, Calif.

"Rezistal" Stainless Steels. Of particular interest to engineers and production men is a folder published by the Crucible Steel Company of America, 405 Lexington Ave., New York 17, N. Y., which presents complete tabular data on the characteristics of the company's "Rezistal" Stainless Steels. Copy free upon request.

Dickerman Hitch Feeds, which can be adjusted to feed from zero to maximum limits of 2 or 4 inches in increments of 0.001 inch for each stroke of the punch press, are fully illustrated and described as to features, specifications, and typical applications in an eight-page bulletin announced by the H. E. Dickerman Manufacturing Co., 321 Albany St., Springfield, Mass. Copy free.

J & L Standard Glass Screens. The Jones & Lamson Machine Co., Springfield, Vt., announces a catalog of standard glass screens for all models of its optical comparators. As indicated in the catalog, the screens are available in two types and in five different sizes. Copy free upon request.



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368

Precision Bronze Bearings. The Rano Bronze Corp., Clearfield and Witte Sts., Philadelphia 34, Pa., now has available a four-page illustrated folder describing its bronze precision bearings, which are offered in sleeve, single and double-frange, split, and graphite-lined types. Copy free upon request.

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Robbins No. 3 Drillmatic, a standard machine expressly built for special purpose drilling, reaming, tapping, and boring operations, is the subject of a colorful eight-page catalog released by the Robbins Engineering Co., 318 Midland Ave., Detroit 3, Mich. In addition to illustrating and describing the various features of the machine, the catalog contains concise descriptions of the construction and operation of the unit. Copy free upon request.

Hobart "Weldmobile," a complete selfpropelled gasoline-driven arc welder for railroad and other types of welding, is described in a four-page illustrated pamphlet published by The Hobart Brothers Co., Box DM-737, Troy, Ohio. Copy free upon request. Chemical Publishing Company 1947 Catalog. The Chemical Publishing Co., Inc., 26 Court St., Brooklyn 2, N. Y., has issued a 1947 catalog listing latest books on chemistry, technology, physics, general science, mathematics, engineering, metals, technical dictionaries, college and other textbooks, and so on. Librarians, technical and scientific workers will, it is claimed, find the catalog especially useful since it conforms with many of their specific needs in listing the date of publication of each book, as well as price, number of pages, description, and full table of contents. Copy free upon request.





# MEAD AIR BRESS

These new Mead Air Presses deliver 400 and 1200 lbs. pressure respectively on 100 PSI. Handle many staking, crimping, assembly, and similar operations. Clearances 4" and 7½" respectively. With foot control these

presses will speed up countless bench jobs, save muscular effort. Write for new Air Power Catalog—just off the press.

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CHICAGO 41, U. S. A.

Desmond Diamond Tool Reference Guide. A four-page illustrated bulletin with full dimensional data and prices on Desmond "True-set" diamond tools and nibs has been published by the Desmond-Stephen Mfg. Co., Urbana, Ohio. The bulletin lists diamond hand tools, diamond wheel dressers for valve grinding machines, and straight shank diamond tools and nibs. Pointers on the proper use of the tools are also included. Copy of Bulletin No. D-8 free upon request.

**NEW HEAVY DUTY VERSATILE TOOL** 

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Micro Screw Jack are handy in TOOL CRIB. One day's use pays for it. ENGINEER'S FORGING CO. 308 Blvd. Bldg., Detroit 2



Falk Steelflex Couplings are the subject of a 32-page bulletin published by The Falk Corp., Milwaukee 8, Wis. Illustrations on the introductory pages graphically illustrate how Falk Steelflex Couplings are used by all types of industries on applications where shafts are coupled. Following this is complete descriptive and illustrated information on the design and construction features of the couplings and the advantages resulting from same. Additional sections provide a simplified method for selecting the proper coupling for motor and turbine drives; formula for selecting Steelflex Couplings: dimensions of the couplings: and ordering information.

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Copy of Bulletin 4100 is available free of charge to interested mechanical execu-

tives upon request.

Magnolia Metals. The Magnolia Metal Co., 18 W. Jersey St., Elizabeth 4, N. J., has available literature descriptive of its various bearing metals and bearing bronze. Copies free upon request.



TUBING CUTTER GROUP - FOR FAST DEBURRING OF EVERY

TUBE DEBURRING **CUTTERS (Standard)** 



18 Standards in H.S.S. and Cemented Carbide

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"Changing Attitudes in Industry" is the subject of a brochure published by Hall and Liles, National Bank Bldg., Detroit, Mich. The brochure provides an approach to two of industry's immediate problems; namely, increased production and better employee relations. A description of specialized programs which have been worked out for a number of leading industrial organizations to solve such problems is contained in the brochure, copy of which is available free.

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P&W Electrolimit Height Gage, a precision instrument designed for use in gage inspection rooms, toolrooms, and throughout many shops and said to be particularly useful in comparing or transferring gage block-established dimensions and in checking runout, is fully illustrated and described in a four-page folder now available free from Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Connecticut.

"The Electronic Link Between Measurement and Control" is the title of a 20page educational bulletin on automatic temperature control systems now being issued by the Wheelco Instruments Co., 847 W. Harrison St., Chicago 7, Ill. The bulletin includes charts, tables, and diagrams explaining measurement and automatic control and the election of proper control systems for process applications. "Thermocouples, Their Placement and Hints Governing Their Use" and "Selec-tion of Thermocouple Protecting Tubes" are topics which are treated separately. A.S.M.E. terminology referring to processes and automatic control is also listed. Copy of Educational Bulletin No. 5 free upon request.



#### SAVE

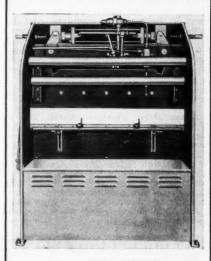
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Designed and manufactured by the makers of LYNN Heavy-Duty, Self-Indexing Bed Turrets and Double Locking Tool Post Turrets.

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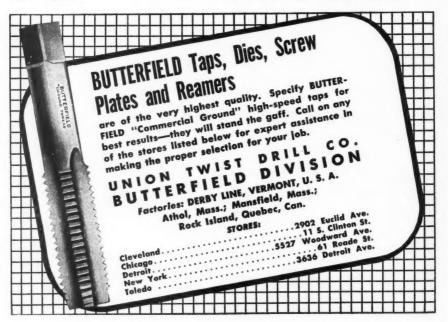
Progressive Motor - Operated Flash Welders. A technical bulletin describing its improved line of motor-operated flash welders has been made available by the Progressive Welder Co., 3050 E. Outer Dr., Detroit 12, Mich. The bulletin lists four basic sizes having ratings at 50 per cent duty cycle of 20, 50, 100, and 150 kva and upset forces of 2,250, 4,500, 11,500 and 19,600 lb. respectively. The bulletin includes complete specifications, illustrations of the complete machines, and detailed close-up views. In addition, a phantom cutaway sketch of a typical machine with labeled arrows locating operational features and the main working parts is provided. Copy of Bulletin No. 204 free.

Power Drive Flexible Shafts. The F. W. Stewart Manufacturing Corp., 4311 Ravenswood Ave., Chicago 13, Ill., has issued a four-page bulletin containing illustrations, descriptions, and list prices of its Power Drive Circle Ess Flexible Shafting for use in all types of metal, plastics, porcelain, or wood work. The three types in which the shafts are available are treated, as well as a high speed lightweight flexible shaft kit. Copy free upon request.

Lyon-Raymond Hydraulic Hand Pallet Lift Truck is illustrated and described as to features, specifications, and so on, in Bulletin 221 now available free from the Lyon-Raymond Corp., 3352 Madison St. Greene, New York.

"Over Ruts and Holes" is the title of a 12-page folder published by the Stonhard Co., 403 N. Broad St., Philadelphia S, Pa., outlining the overlaying or patching of industrial concrete, wood, brick, and composition floors with Stonhard Resurfacer. The folder covers product uses, advantages, method of application, material coverages, and so on. In addition, several typical finished installations on traffic aisles, floors, platforms, and outside ramps are described and illustrated. Copy free upon request.

Watson-Flagg Model "C" Precision Thread Roller, product of the Watson-Flagg Machine Co., Inc., Paterson, N. J., is the subject of a six-page illustrated bulletin released by this firm. Information on applications, production, capacity, features, and specifications is presented. Copy free upon request.



Rockford Hy-Draulic Machine Tools, Especially designed for the production engineer or the company executive who selects and buys machine tools and for the plant superintendent or the shop executive responsible for machine tool selection and performance, a 32-page catalog containing essential facts regarding the design, application, and performance of its Hy-Draulic shapers, planers, slotters, and shaper-planers is announced by the Rockford Machine Tool Co., Rockford, Ill. Copy free upon request.

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"Grits and Grinds" Vol. 38, No. 1. In this issue of the Norton monthly house organ, the first part of an article on "Injury in Ground Surfaces" is featured. The booklet also contains brief illustrated articles on the grinding of die surfaces with 32 Alundum; the grinding of refrigerator compressor eccentrics at the rate of 27,000 pieces per (32 Alundum) wheel; and the Oslund Duplex Labeler recently added to the Norton line.

Copy of "Grits and Grinds" Vol. 38, No. 1 is available free to individuals writing to the Norton Co., Worcester 6, Massachusetts. M.S.A. "Blastfoe" Abrasive Helmet, designed to provide comfortable protection against high velocity abrasives in shot or sand-blasting operations, is illustrated and described in Bulletin No. CS-22 now available free from the Mine Safety Appliances Co., Braddock, Thomas and Meade St., Pittsburgh 8, Pa.

Orlandi Gear Checker, product of the Orlandi Gear and Machine Co., 16209 Meyers Rd., Detroit 27, Mich., is the subject of an eight-page catalog published by this firm. The catalog illustrates and describes the function of the machine in checking pitch diameter, concentricity, size, tooth spacing, backlash, and parallelism with pins and balls. Copy free upon request.

Hanchett Vertical Spindle Production Surface Grinders are featured in an eightpage illustrated bulletin published by the Hanchett Manufacturing Co., Big Rapids, Mich. The bulletin describes new and improved surface grinding procedures with reciprocating table type vertical spindle grinders and provides complete machine data. Copy free upon request.



47

"Grid" Blast Coils are covered in a catalog published by the D. J. Murray Manufacturing Co., Wausau, Wis. In addition to a detailed description of the one-piece high test cast iron construction of the "fin" heating sections featured in the blast coils, the catalog contains diagrams of installations, performance charts, temperature differential conversion tables, physical data, and specification. Classifications of industries using Grid Blast Coils are also listed in the catalog, copy of which is available free.

"Small-Hole Grinding with Diamond-Charged Mandrels" is the title of an illustrated article comprising Vol. XII, No. 11 of "Diamonds in Industry," a house organ devoted to the uses of diamonds in industry and published by J. K. Smit & Sons, Inc., 157 Chambers St., New York 7, N. Y. Copy free upon request.

Plastic Mold Polishing Service. A four-page two-color folder issued by the Acme Scientific Co., 1448 W. Randolph St., Chicago 7, Ill., describes in detail the company's new plastic mold polishing service which is said to provide for the removal of pits, scratches, "lemon-peel" and toolmarks. waves. Photographic illustrations of several molds are presented, together with detailed information and technical data on Acme's lapping and optical polishing methods. Copy free upon request.

Ex-Cell-O Cylinder Boring Machines. No. 4, Vol. 22 of Ex-Cell-O "Tool Tips", issued by Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 6, Mich., features the cylinder boring machines made by this firm for the automotive industry and presents illustrations of various types of standand angular machines for straight or V-type blocks, together with a vertical type of machine for in-line blocks. A copy of this issue of Tool Tips is available for the asking.

MGC Generators. The Motor Generator Corp., Division of The Hobart Brothers Co., Hobart Square, Troy, Ohio, has published a four-page illustrated pamphlet describing its latest models of generators and four-circuit automatic equipment for charging motive power batteries used in electric trucks. Copy free upon request.



Pictured: a 24-Spindle Heavy-Duty Drill Head.

DESIGNERS AND MANUFACTURERS OF MULTIPLE DRILL-ING EQUIPMENT.

We Invite Your Inquiry.



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971 E. 8-Mile Road, Hazel Park, Mich.

Hy-Pro Taps. A 16-page pocket-size folder now being distributed by the Hy-Pro Tool Co., New Bedford, Mass., illustrates and describes Hy-Pro Ground Thread Taps, including their various construction features and the handy manner in which they are packaged. Special taps are also shown and briefly described. Copy free upon request.

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Pratt & Whitney Model C Electrolimit Snap Gage, a portable comparator for checking outside dimensions right in the machine or in the inspection department, is pictured and fully described in a four-page folder released by Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Conn. Copy free.

"Steelset" Sintered Steel Bonded Diamond Wheels for use in grinding glass, quartz, vycor, ceramics, granite, sapphire, and other gem stones, cemented carbides, and all other hard, brittle, abrasive materials are the subject of Bulletin DT 319 now available free from the Fish-Schurman Corp., 230 E. 45th St., New York 17, New York.

Cratex Rubberized Abrasive Wheels and Points for fine grinding and polishing are the subject of a four-page illustrated catalog section published by the Cratex Manufacturing Co., Industrial Div., 81 Natoma St., San Francisco 5, Calif. In addition to wheels and points, the catalog section depicts and briefly describes rubberized, abrasive and polishing blocks and sticks, cones, lap wheels, and ring buffs. A price list of the various products listed in the catalog section is included with same. Copy free.

Pratt & Whitney Air-O-Limit Comparators for checking and inspecting of production parts are depicted and described in a 16-page circular prepared by Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Conn. The circular fully discusses the operation of the comparators, as well as the various models in which they are available. Special comparators are also shown and briefly described. Standard scale layouts are provided at the rear of the circular, copy of which is available free by requesting Circular No. 487.



Plunger moves away from, instead of against the lever, protecting delicate parts from sudden or excessive jolts. Each graduation on scale represents 1/1000" movement of plunger. \$6.50.

#### KOCH Test Indicator

Two working ends—one to test outside surfaces, the other inside. For precision work and toolmakers' use.

# Positive - Lock SURFACE GAGE

Drawbolt has positive lock to prevent slippage. Spindle:  $9'' \times 5/16''$ . Block:  $31/4'' \times 21/2'' \times 1''$  with  $90^\circ$  angle groove in base. \$6.00.

Dealers wanted to sell these tools. If no dealer write for circulars on the Koch Test Indicator and the new toolmaker's surface gage.

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Allis-Chalmers Oil Circuit Breakers are the subject of a four-page revised bulletin announced by the Allis-Chalmers Manufacturing Co., Milwaukee 1, Wis. In addition to describing the construction of the breakers and listing their extra protection features, the bulletin mentions that the units are available for electrical and manual remote control operation, lists accessories, and provides a table of maximum current, voltage and interrupting capacity ratings, together with a reference chart of general dimensions. Copy of Bulletin 71B6179B free upon request.

D-H Heat-Treating Fixtures for pittype furnaces are illustrated and described in a 24-page bulletin published by the Driver-Harris Co., Harrison, N. J. A large number of fixtures designed for specific heat-treating purposes in conjunction with pit-type furnaces are shown, accompanied by a description of the fixture and its special application. The back page of the bulletin includes a handy list of all D-H heat and corrosion-resistant and electrical resistance alloys. Copy of Bulletin F-46 free upon request.

"Blitzrev" Surface Grinder Attachment, which is designed for easy installation and is furnished with seven quills to accommodate wheels of ½ to 2½ inches in diameter, is illustrated and described in a bulletin issued by the D & S Model Co., 105-35 S. Robert St., Ludington, Mich. Copy free upon request.

Nelson Electric Arc Stud Welder. A 36page brochure describing a wide variety of applications of high speed stud welding has been published by the Nelson Sales Corp., Lorain, Ohio. Among the standard and specialized studs illustrated are such types as staybolt, lagging, hook, hangar, spacer, and step studs, which are applied by the 5-lb. Nelson Electric Arc Stud Welder at rates up to 30 per minute. The use of simple Masonite and light gauge steel templates making possible tolerances up to 0.005 inch is described, as are special production machines for semiautomatic and automatic operation. Detailed specifications and physical characteristics are also tabulated in the brochure, copy of which is available free to mechanical executives addressing requests on their company letterheads.

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You can have dependable hydraulic pressure at surprisingly low cost with a Manco Press. It handles a wide variety of pressing, straightening, bending, flattening, broaching, assembling and other operations. This economical, well-built press cuts costs and saves money. Self-contained! Hand operated! Quick application of power—ram travels ½" per stroke. Adjustable bolster. Press does work formerly considered only possible on larger, heavier and more costly equipment. Ask your dealer, or write giving his name and address, for details. Manco Products Co., State & Hay Sts., York, Pa. \*F.O.B. York, Pa. Pressure gauge and 2-ton rack and pinion arbor press are extra. Price subject to change. Immediate delivery.

	SPECIFIC	CATIONS	
Capacity	25 tons	Width between table	
Distance between		51/2"	
uprights	30"	Overall height	60"
Ram diameter	2 3/4"	Floor space 34'	× 27 1/2"
Ram travel	41/2"	Weight, with arbor	
Table travel	35"	press	420 lbs.

**MANCO HYDRAULIC PRESS** 

MOVE PRESS TO WORK instead of WORK TO PRESS



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It's easy to save time and money by using Siewek clamp assemblies and parts instead of designing and producing special fixture clamps and fittings. Usually a Siewek clamp does the job—with only a minimum of details required in fitting. Remember, you can

Every Siewek clamp provides secure holding through uniform right angle pressure. Heat-treated and hardened Siewek clamp bars last for years—with an ample margin of safety.

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Write today for full size template drawings for layout use.

Siewek Tool Company

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Detroit 2, Michigan

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Reliance Induction Motors. Two bulletins on Reliance "Series C" Induction Motors have been published by the Reliance Electric and Engineering Co., 1076 Ivanhoe Rd., Cleveland 10, Ohio. Bulletin C-118 covers protected (open type) frame sizes 203 to 326, with ratings from ½ to 20 h.p., 600 to 3,600 r.p.m. Construction details, including all-steel frames, welded cores, aluminum pressure-cast rotors, and the new Reliance precision bearing mount, are described. Thirteenstep insulation treatment for Class A (40, 50, and 55 deg. C. temperature rise) and Class B (70 and 75 deg. C. rise) motors is detailed. Special modifications for vertical, flange, footless and shaftless mounting, as well as 25-cycle design, are covered.

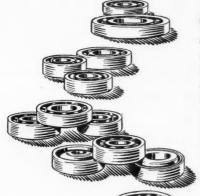
Totally-enclosed, fan-cooled Series C motors are described in Bulletin C-125, which deals with squirrel-cage frame sizes 224 to 326 for two and three-phase a.c. circuits. Copy of either or both bulle-

tions free upon request.

Roto-Clone Type D Dynamic Precipitator. A 20-page illustrated bulletin covering the Roto-Clone Type D Dynamic Precipitator, a device particularly adopted to the dry collection of practically every type of granular industrial dust, is announced by the American Air Filter Co., Inc., 215 Central Ave., Louisville 8, Ky. The bulletin provides descriptions and detailed views of wear liners, radiation shields, skimmer precleaners, aftercleaners, rotary locks, trickle valves, and Roto-Clone Models E and F self-contained units, together with capacity and dimension tables for each size. Copy of Bulletin No. 272-A free upon request.

"DFI Planned Products" is the title of a 12-page illustrated booklet now being issaed by Designers for Industry, Inc., 2915 Detroit Ave., Cleveland 13, Ohio. The booklet describes the 12 integrated industrial services offered by this firm, which include industrial design, development engineering, experimental manufacturing, production engineering, industrial engineering, management counsel, market analysis, technical surveys, industrial research, distribution planning, retail stores, and new products. In addition to containing illustrations of many typical DFI planned products, the booklet contains case histories of results obtained through planned products service. Copy free upon request.





Get your bearings from the \$18,000,000 stock now being sold by WAA. Friction and anti-friction bearings and components in all sizes and types are included in this stock. Many sizes are available in production-run quantities. Set your own price on what you need and submit your bid. Get all pertinent information from your nearest Customer Service Center or WAA Regional Office—go there to make your own inspection.

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Morse Short Standard Drills for screw machines, electric drills, and garage mechanics are the subject of a six-page circular published by the Morse Twist Drill & Machine Co., New Bedford, Mass. The circular lists a complete line of short standard drills of high speed steel ranging in diameters from  $\frac{1}{16}$  to 2 inches, and discusses the special design of the drills which adapts them for screw machine work, as well as shallow hole drilling and portable electric drill operations. Copy free upon request.

Pratt & Whitney Electrolimit Mill Gages. Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Conn., now has available a 16-page circular which fully illustrates and describes its various Electrolimit Mill Gages which are regularly applied to continuous cold rolling mills, continuous inspection lines, and continuous shearing lines to inform an operator how thick the strip is coming out of the rolls or for classifying sheared sheets. Various attachments for use with the gages are also covered. Copy of Circular No. 489 free.

"Sampling Techniques Applied to Quality Control" is the title of an eight-page leaflet announced by the North American Philips Co., Inc., 100 E. 42nd St., New York 17, N. Y. Written by Eugene Goddess, factory engineer, the leaflet includes three charts and three tables, plus text material. Copy free upon request.

"Metallurgical Applications of the X-Ray Diffraction Spectrometer" is the title of a 16-page leaflet published by the North American Philips Co., Inc., 100 E. 42nd St., New York 17, N. Y. Written by John L. Abbott, application engineer, the leaflet contains 15 photographs, 23 charts, and three tables, plus text material. Copy free upon request.

Typical Examples of Development in Rubber and Koroseal" is the title of a 28-page booklet issued by The B. F. Goodrich Co., Akron, Ohio, which reproduces 26 of the company's case history advertisements during recent months that stress the part played by research and development in solving problems for customers. Copy free upon request.





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... put precise control of mighty muscles at your finger tips

Hanna Unitite Valves are designed and built to give long, trouble-free service. They are quick-acting, packless and permanently tight. Except for periodic lubrication they require no maintenance. They may be used as 3-way or 4-way valves operating at air, oil or water pressures up to 250 psi. for the 4", ½" and ¾" sizes; up to 150 psi. for the 1" size and up to 100 psi. for the 1\%" size. They are available in three different styles for standard mounting, column mounting or manifold mounting.

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Hanna Speed Control Valves provide adjustable control of inflow as well as outflow of air and oil independently to and from one side of cylinder piston.

# Valve Bulletin

Bulletin No. 235 gives operating and mechanical data on all Hanna Valves. Write for a copy.



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1765 Elston Avenue, Chicago 22, Illinois

Oliver "Ace" Universal Tool and Cutter Grinders are the subject of a 12-page catalog published by the Oliver Instrument Co., Adrian, Mich. The catalog illustrates and describes the standard Ace Cutter Grinder, including its use with various fixtures for grinding spiral taper reamers, hobs, spotfacers, counterbores, end mills, double angle cutters, face mills, gear cutters, and other tools. Also featured is the heavy duty Ace for the precision grinding of tungsten carbidetipped tools. Complete specifications of both types of grinders are included in the catalog, copy of which is available free.

Johansson Gage Blocks and Accessories. The Ford Motor Co., Johansson Div., 3650 Schaefer Rd., Dearborn, Mich., has issued an 18-page pocket-size folder which illustrates and describes a complete line of gage blocks and accessories, including sets comprising 81, 7, and 5 blocks; accessory sets consisting of 22 pieces; sine bars; straight bars; and so on. Copy free upon request.

PROMPT DELIVERY
UP TO 12" DIAM. - 3 D. P.
CUTTING ONLY OF COMPLETE GEARS
LATEST GLEASON EQUIPMENT

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Cincinnati, Ohio

Kennametal Cemented Carbide Products Catalog 47. Kennametal Inc., Latrobe, Pa., has issued a 68-page catalog listing clamped-in solid round tools for mass production jobs requiring complex tool setups; tools having clamped-in blades for single grooving or cutting-off operations; internal radius tools and blanks for the round-cornering of metal parts; axial face Kennamills (milling cutters have inserted Kennametal-tipped blades) designed for wide cuts as well as deep, chamfer, and form cuts; saws and router bits for plastics, light alloys, and other materials; Kennadrills for masonry; and standard solid Kennametal rolls for Sendzimir cold metal strip mills. Copy of Catalog 47 free.



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for restoring battered threads on studs, bolts and threaded shafts.

> A Few Quick Easy Strokes Does It.

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No. 1 NU-TRIX with 11, 12, 13, 14, 16, 18, 20, 24 Threads To the Inch No. 2 NU-TRIX with 9, 10, 15, 16, 20, 26, 28, 32 Threads To the Inch

PRICE: \$2.00 EACH

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**Contains 8 Threads On One Tool** 

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new liquid type, water soluble lubricant for grinding and cutting—highly detergent, gives faster, keener, cleaner grinding.

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original paste-form water soluble grinding lubricant for the highest reflective finishes.

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to make oils for grinding and cutting.

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for all types of oil grinding operations.

Bring your grinding and cutting lubrication problems to us for the dependable advice of our experienced technicians.

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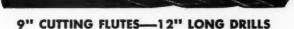


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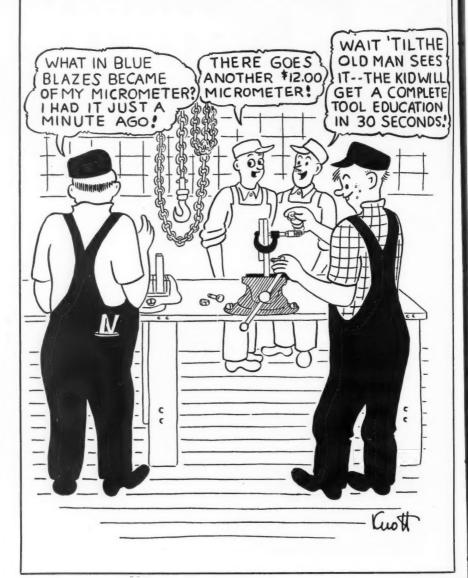
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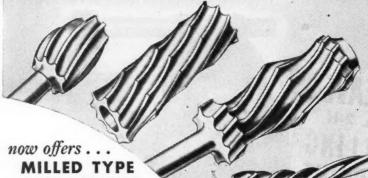


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Scherr Co., Inc., George         58           Schmidt, Inc., Geo. T.         214 278           Schmillo Aero Tool Engr. Co.         .81           Schultes Level, Inc.         .386           Schultes Level, Inc.         .386           Schultes & Anderson Co.         .148           Screw Machine Specialty Co.         .22           Seneca Falls Machine Co.         .23           Service Machine Co.         .165           Services Directory         .390, 391           Severance Tool Industries, Inc.         .370           Shearcut Tool Co.         .263           Sheffdeld Corp.         .129           Sheldom Machine Co., Inc.         .96           Sibley Machine & Foundry Corp.         .19           Simonds Abrasive Co.         .121           Simonds Saw & Steel Co.         .149           Smith Boring Chuck Co.         .364           Snap-On Tools Corp.         .229           Snow Mfg. Co.         .213           Sossner Tap & Tool Corp.         .35	Wall-Colmonoy Corp.       285         Walls Sales Corp.       346         Waltham Machine Works       301         Walton Co.       291         War Assets Corp.       379         Wardwell Mfg. Co.       196         Warner & Swasey Co.       18, 19         Wetts Bros. Tool Works       303         Weldex Inc.       347         Weldon Tool Co.       196         West Coast Aero Tool Co.       368         White & Bagley Co.       333         Whitney Chain & Mfg. Co.       303         Whitney Metal Tool Co.       276         Wiedemann Machine Cop.       330         Wiedemann Machine Co.       120         Willeams & Co.       120         Williams & Co.       J. H.       195         Wilson, K. R.       49         Wilson Mechanical Instrument Co.       95         Wood & Spencer Co.       341         Woodworth Co., N. A.       252, 280
Scherr Co., Inc., George   58   Schmidt, Inc., Geo. T.   214   278   Schmidt, Inc., Geo. T.   214   278   Schrillo Aero Tool Engr. Co.   .81   Schultes Level, Inc.   386   Schultz & Anderson Co.   .148   Screw Machine Specialty Co.   228   Seneca Falls Machine Co.   .23   Sentry Co.   .110   Service Machine Co.   .165   Services Directory   .390   391   Severance Tool Industries, Inc.   .370   Shearcut Tool Co.   .263   Sheffield Corp.   .129   Sheldom Machine Co., Inc.   .96   Sibley Machine & Foundry Corp.   .199   Slewek Tool Co.   .377   Simonds Abrasive Co.   .121   Simonds Saw & Steel Co.   .149   Smith Boring Chuck Co.   .364   Snap-On Tools Corp.   .229   Snow Mfg. Co.   .213   Sossner Tap & Tool Corp.   .35   South Bend Lathe Works   .71   Spartan Saw Works, Inc.   .62   Springfeld Machine Tool Co.   .78	Wall-Colmonoy Corp.       285         Walls Sales Corp.       346         Waltham Machine Works.       301         Walton Co.       291         War Assets Corp.       379         Wardwell Mfg. Co.       196         Warner & Swasey Co.       18, 19         Watts Bros. Tool Works.       303         Weldex Inc.       347         Weldon Tool Co.       196         West Coast Aero Tool Co.       368         White & Bagley Co.       333         Whitney Chain & Mfg. Co.       303         Whitney Metal Tool Co.       276         Wiedemann Machine Cop.       339         Wiedemann Machine Co.       120         Williams & Co.       120         Williams & Co.       J. H.         Wilson, K. R.       49         Wilson, Morbacinal Instrument Co.       95
Scherr Co., Inc., George         58           Schmidt, Inc., Geo. T.         214 278           Schmillo Aero Tool Engr. Co.         .81           Schultes Level, Inc.         .386           Schultes Level, Inc.         .386           Schultes & Anderson Co.         .148           Screw Machine Specialty Co.         .22           Seneca Falls Machine Co.         .23           Service Machine Co.         .165           Services Directory         .390, 391           Severance Tool Industries, Inc.         .370           Shearcut Tool Co.         .263           Sheffdeld Corp.         .129           Sheldom Machine Co., Inc.         .96           Sibley Machine & Foundry Corp.         .19           Simonds Abrasive Co.         .121           Simonds Saw & Steel Co.         .149           Smith Boring Chuck Co.         .364           Snap-On Tools Corp.         .229           Snow Mfg. Co.         .213           Sossner Tap & Tool Corp.         .35	Wall-Colmonoy Corp.       285         Walls Sales Corp.       346         Waltam Machine Works.       301         Walton Co.       291         War Assets Corp.       379         Wardwell Mfg.       0.       186         Warner & Swasey Co.       18, 19         Wetts Bros.       700       Works.       303         Weldex Inc.       347         Weldon Tool Co.       196         West Coast Aero Tool Co.       368         White & Bagley Co.       333         Whitney Chain & Mfg.       0.       333         Whitney Metal Tool Co.       276         Wiedemann Machine Co.       120         Willeams & Co.       120         Willeams & Co.       J. H.       195         Willson, K. R.       49         Wilson Mechanical Instrument Co.       95         Wood & Spencer Co.       341         Woodworth Co.       N. A.       252         280

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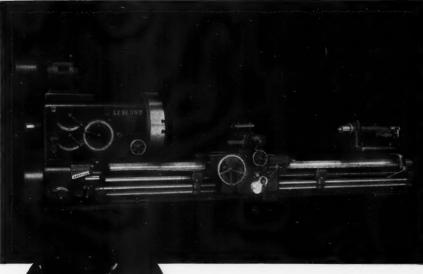
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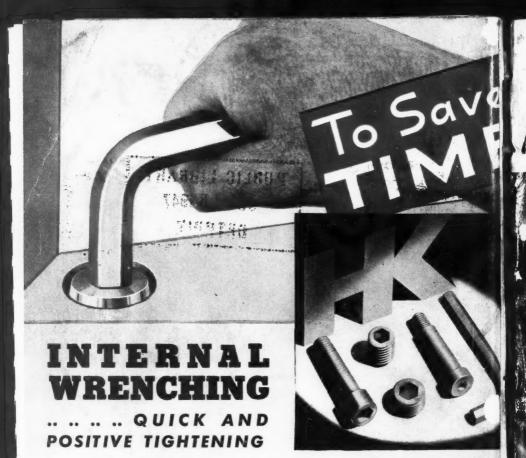
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